



## Regular Research Article

# Has the UK Campaign to End Loneliness Reduced Loneliness and Improved Mental Health in Older Age? A Difference-in-Differences Design

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## ABSTRACT

**Objective:** To estimate the impact of the UK nationwide campaign to End loneliness on loneliness and mental health outcomes among older people in England. **Design:** Quasi-experimental design, namely, a difference-in-differences approach. **Setting:** Local authorities across England. **Participants:** Older adults aged 65 and over participating in waves 4–8 (2008–2017) of the English Longitudinal Study of Aging (ELSA) and waves 1–9 (2009–2019) of the UK Household Longitudinal Study (UKHLS). **Main outcome measures:** Loneliness was measured through the UCLA Loneliness scale. A social isolation scale with components of household composition, social contact and participation was constructed. Mental health was measured by The Centre for Epidemiological Studies of Depression (CES-D) score, the General Health Questionnaire (GHQ-12) score, and the Short-Form-12 Mental Component Summary (SF-12 MCS) score. **Results:** There was no evidence of change in loneliness scores over the study period. Difference-in-differences estimates suggest that explicitly developed and implemented antiloneliness strategies led to no change in loneliness scores (estimate = 0.044, SE = 0.085), social isolation caseness (estimate = 0.038, SE = 0.020) or levels of depressive symptoms (estimate = 0.130, SE = 0.165). Heterogeneity analyses indicate that antiloneliness strategies produced little impact on loneliness or mental health overall, despite small reductions in loneliness and increases in social engagement among well-educated

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and higher-income older adults. The results were robust to various sensitivity and robustness analyses. **Conclusions:** Antiloneliness strategies implemented by local authorities have not generated a significant change in loneliness or mental health in older adults in England. Generating changes in loneliness in the older population might require longer periods of exposure, larger scope of intervention or more targeted strategies. (Am J Geriatr Psychiatry 2024; 32:358–372)

### Highlights

- **What is the primary question addressed by this study?**

Whether the nationwide Campaign to end loneliness affected loneliness and mental health outcomes among older people in England.

- **What is the main finding of this study?**

Overall, there was no significant change in loneliness or mental health over the study period. Among well-educated and higher-income older adults, the antiloneliness strategies significantly reduced loneliness and increased social engagement.

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

Generating changes in loneliness in the older population might require longer periods of exposure, larger scope of intervention or more targeted strategies.

## OBJECTIVE

Loneliness, which refers to dissatisfaction with the quantity and quality of social relations, is a common experience in older age.<sup>1–3</sup> In 2020/2021, 17% of adults aged 65–74, and 24% of adults aged 75 years and older, reported feeling lonely some of the time or often/always.<sup>4</sup> In Europe, approximately 20% of older people frequently felt lonely based on a report in 2022.<sup>5</sup> Major risk factors that render older people feeling lonely include age-related decline in function, reductions of economic and social resources, loss of loved ones, and poor health.<sup>6</sup> Loneliness increases risks of all-cause mortality and cardiovascular disease,<sup>7,8</sup> and the association between loneliness and mortality is comparable with quitting smoking and is stronger than that for common risks factors such as physical inactivity and obesity.<sup>9</sup> Loneliness also predicts poor self-reported health,<sup>10</sup> cognitive impairment,<sup>11,12</sup> and depressive symptoms.<sup>13–16</sup>

Loneliness is increasingly recognized as an important public health issue.<sup>17</sup> Addressing loneliness and social isolation has been incorporated in the World Health Organization's "Decade of Healthy Ageing;

Plan of Action 2020–2030."<sup>18</sup> However, there is limited evidence on the impact of large-scale policies and interventions on loneliness and mental well-being. Most studies have focused on small-scale interventions implemented in small groups of older people, and these studies have produced mixed effects on loneliness reductions.<sup>19–22</sup> Overall, evidence suggests that reducing loneliness is difficult, with many studies showing limited or no impacts of antiloneliness programmes or interventions on measurable outcomes.<sup>23</sup> However, the small scale and narrow focus of interventions evaluated in prior studies may have rendered them less indicative of how national campaigns to reduce loneliness might impact outcomes. Further research is therefore needed to understand the effectiveness of large-scale antiloneliness programmes.

In this study, we estimate the impact on loneliness and mental health of a series of antiloneliness strategies implemented in England at the local authority level as part of a national campaign in the UK labelled "the campaign to End Loneliness." The campaign to End Loneliness aimed to reduce the prevalence of loneliness feelings among older people in the UK. Since 2013, it operated by rising awareness on loneliness

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among Health and Wellbeing Boards (HWBs), which are formal committees in each local authority responsible for integrating the national health service, public health and local government. The campaign to End Loneliness lobbied HWBs to develop antilongeliness strategies through local health and wellbeing strategies.<sup>24</sup> It also ranked the levels of activities against loneliness among the HWBs and classified them into four groups depending on the level of activity and strategy development and implementation. HWBs ranked as “gold” had established measurable targets and undertaken concrete actions to address loneliness, whereas those labelled as “silver” or “bronze” only had stated commitment to understanding the issue of loneliness in local areas. Overall, by May 2013, a total of 8 HWBs had “gold” antilongeliness

strategies in place, whereas 25 HWB had “silver” strategies, 28 had “bronze” strategies, and 91 had not developed health and wellbeing strategies related to loneliness. Table 1 shows examples of the themes, action plans, and activities in local areas with “gold” antilongeliness strategies adopted by the HWBs. The scope of the strategies ranges from launching “Age-Friendly City” programmes with the focus of loneliness reductions, collection of data on loneliness in local communities, to promotion of behavioral change, education, collaborations, and a range of supportive activities.

We exploit this heterogeneity in the implementation of antilongeliness policies at local authority level as a potential source of variation to identify the effect of local antilongeliness interventions on loneliness and

**TABLE 1. Action Plans and Activities in Local Areas With “Gold” Antilongeliness Strategies**

Themes	Plans and Activities
Agenda setting	<ol style="list-style-type: none"> <li>1. Launching specific programmes that identify loneliness and isolation as a priority area. Examples include the “Age-Friendly City” programmes targeting at reducing loneliness and isolation among older people.</li> <li>2. Developing health and wellbeing strategy performance framework to assess progress in reducing loneliness and isolation.</li> <li>3. Setting up health and wellbeing governance framework to manage priorities, personnel, responsibilities, and accountabilities related to antilongeliness projects.</li> <li>4. Committing to incorporate existing research knowledge and practice (e.g., “Neighborhood Approaches to Addressing Loneliness” by Joseph Rowntree Foundation; “Antilongeliness toolkits” by Campaign to End Loneliness) in making antilongeliness strategies and approaches.</li> <li>5. Developing partnerships with stakeholders from different organisations, sectors, and local areas in addressing loneliness and isolation and improving quality of life for older people.</li> </ol>
Data collection and sharing	<ol style="list-style-type: none"> <li>1. Setting target groups for older people who are socially lonely are isolated, through target group surveys.</li> <li>2. Identifying loneliness among older adults in local areas and mapping need to tackle loneliness. Measurements include target group surveys, assessment of data change in participation or membership of organized activities and support.</li> <li>3. Identifying shared priorities and actions across partner organisations.</li> <li>4. Establishing formalized joint programmes with partners (e.g., NHS) to scale interventions to promote independence of older people.</li> </ol>
Behavior change	<ol style="list-style-type: none"> <li>1. Promoting mind-set change regarding independence, self-reliance, and self-care among older people and local communities.</li> <li>2. Promoting lifestyle change related to health behavior, physical and social activity. Examples include setting up integrated Healthy Lifestyles Service to reduce alcohol-related health problems among older people and enable them to live independently.</li> </ol>
Education and collaborations	<ol style="list-style-type: none"> <li>1. Promoting knowledge related to reducing loneliness and isolation, such as peer support, community emotional resilience, in local areas.</li> <li>2. Making use of antilongeliness training resources and toolkit and seek “Health-Watch” consultation from experts or organisations (e.g., Campaign to End Loneliness).</li> <li>3. Training of front-line staff and volunteers to support self-care approaches.</li> <li>4. Exploring community budget approach to stimulating support for vulnerable older people; and encouraging further investment in prevention work, including increasing the role for third-sector partners in policy planning and service-delivery.</li> <li>5. Organizing regular health and wellbeing strategy stakeholder meetings to gather feedback to priority-setting and results of service delivery.</li> </ol>
Support and activities	<ol style="list-style-type: none"> <li>1. Exploring new models of care for older people at risks of illness or loneliness (e.g., implementation of “Living Longer Living Better” programmes).</li> <li>2. Hosting and inviting older people to participate in networking and learning activities regularly (e.g., monthly).</li> <li>3. Exploring diverse approaches (e.g., lunch clubs) that enable older people to meet new friends and develop social networks.</li> <li>4. Improving housing conditions to maximize independence, reduce loneliness and isolation, and improve sense of safety and quality of life among older people.</li> <li>5. Improving public transport accessibility to older people to reduce social isolation and increase sense of control in daily lives.</li> <li>6. Encouraging investment in services which support lonely or isolated older people to participate in social groups or community activities in local areas.</li> <li>7. Developing partnerships with voluntary sectors to resolve issues of loneliness and isolation, delivered at neighborhood levels.</li> </ol>

mental health in older adults. This is due to the “quasi-random” nature of participation in the Campaign, in that each local authority was responsible for their own decisions regarding their levels of involvement in the Campaign and the intensity of antilooneliness measures or activities taken up. In particular, we distinguish a “treated” group of older people who are potentially exposed to active interventions based on their area of living, and a “comparison” group of older people living in areas where no measurable antilooneliness actions were implemented. We assign exposure to antilooneliness strategy based on whether individuals are living in HWBs that were recognized as having antilooneliness strategies in place by mid-2013 (“gold-ranked”). We employ data from two large longitudinal datasets in England, English Longitudinal Study of Aging (ELSA) and UK Household Longitudinal Study (UKHLS). We analyze the impact of the campaign to End Loneliness by comparing changes in loneliness, social isolation and depressive symptoms among older adults aged 65 years and over. Using a difference-in-differences design,<sup>25</sup> we compare changes for respondents living in active (“gold-ranked”) local authorities relative to changes in adults living in less active local authorities against loneliness. To our knowledge, this is the first study to assess how a major national campaign implemented through local authorities influences loneliness and mental health in the older population.

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## METHODS

### Data Sources

We used data from two large longitudinal datasets—the English Longitudinal Study of Aging (ELSA) and the UK Household Longitudinal Study (UKHLS). ELSA is a biannual survey that examines aspects of ageing such as health, social care, social and civic participation in older adults aged 50 years and older.<sup>26</sup> We complemented ELSA data with UK Household Longitudinal Study (UKHLS), an annual representative survey of households in the UK.<sup>27</sup> We linked geographic data at the local authority level to ELSA participants in waves 4–8 (2008–2017) and UKHLS participants in waves 1–9 (2009–2019). We also restricted the sample to older adults who were aged 65 years and over; and were living in regions where

at least one local authority was ranked as “gold” (i.e., having implemented meaningful antilooneliness strategies by mid-2013). We did this to enhance the comparability between treatment and comparison local authorities within each region. This gave us initial samples of 3,809 persons (with 11,695 observations) in ELSA and 6,655 persons (with 30,435 observations) in UKHLS. We then kept participants with complete information on mental health outcomes and covariates. We obtained analytic samples of 3,540 persons (with 10,639 observations) in ELSA and 5,607 persons (with 23,354 observations) in UKHLS. In sensitivity analyses, we also reported findings based on samples of all nine regions of England using both ELSA (8,082 persons with 24,799 observations) and UKHLS (11,901 persons with 51,660 observations).

Data on loneliness and social isolation came from ELSA. We measured loneliness using the University of California Los Angeles (UCLA) Loneliness scale,<sup>28</sup> which asked how often respondents felt the lack of companionship, left out, and isolated from others. The answers were coded as 1–3 for “hardly ever or never”, “some of the time”, and “often,” and we included respondents who answered all three items and obtained a total score of 3 (not lonely) to 9 (very lonely). We also assessed loneliness caseness using UCLA loneliness scale ( $\geq 6$ ).<sup>29</sup> To capture the structural (e.g., size and frequency) and functional (e.g., quality) dimensions of social isolation,<sup>30</sup> we constructed a score based on whether living alone, lack of contact with children, family and friends, whether having membership in social groups, clubs or societies, with the higher scale indicating higher levels of social isolation. Previous studies also used similar components to construct a multidimensional measurement of social isolation.<sup>11,31</sup> We also coded those with a score of 3 and over as highly socially isolated.

In addition to loneliness and social isolation, we also constructed measures of social participation, as one of the potential behavioral changes that may arise as a result of the campaign.<sup>32</sup> We included aspects of family (measured by at least monthly contact with children), friendship (measured by at least monthly contact with friends in ELSA and valuing local friends in UKHLS), being active in social activities (e.g., arts, sports), regular volunteering (at least monthly), and unpaid help and caregiving (measured as having offered any unpaid help in the past 12 months in

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ELSA and having offered care to vulnerable people living within or outside the household in UKHLS).

For mental health outcomes, in ELSA we used the Centre for Epidemiologic Studies Depression (CES-D) scale,<sup>33</sup> a validated measure that examines interpersonal relations, positive affect, depressed affect and somatic or vegetative activity.<sup>34</sup> Higher scores indicate higher levels of depressive symptoms, and a cut-off of 4 was used to define elevated levels of depressive symptoms in the Appendix. In UKHLS, we used the 12-item General Health Questionnaire index (GHQ-12) that measures psychological distress on a scale between 0 and 36, with higher values signaling worse health. GHQ-12 caseness (GHQ  $\geq 12$ ) as an indicator of the presence of common mental disorders<sup>35</sup> was also assessed. We also used the Short-Form-12 Mental Component Summary (SF-12 MCS), a generic health-related quality of life instrument which produces a mental health score of 0–100 with higher values signaling better mental health.

We controlled for covariates potentially associated with social isolation, including: Age, age squared, education (less than GCSE, GCSE, A-level or more), employment (employed, retired, unemployed or sick or other reasons out of labor market), household income (quartiles), owning a house (yes = 1), being married (yes = 1), having child(ren) (yes = 1), poor physical health (defined as having at least one Activities of Daily Living limitation), local authority, and survey wave.

### Statistical Analysis

We used a difference-in-differences (DiD) approach, a policy evaluation technique that tries to mimic an experimental design by examining the differential change in a treatment group relative to a comparison group.<sup>36</sup> To identify treatment and comparison groups, we exploited differences in campaign exposure across local authorities. In particular, we measured changes in loneliness scales before and after 2013 for respondents living in local authorities that had implemented antilooneliness strategies and actions (the treatment group), and compare these to changes in loneliness scales for respondents living in local authorities that had not implemented strategies or actions (the comparison group). We defined treatment based on whether respondents were living in local areas where HWBs had been classified as

“gold,” while the comparison group included all other local authorities. Using Ordinary Least Squares (OLS), our model specification is as follows:

$$Y_{iht} = \beta_0 + \beta_1 \text{time}_t + \beta_2 \text{Treatment}_h + \beta_3 \text{time}_t \\ * \text{Treatment}_h + \beta_4 X_{iht} + \varepsilon_{iht}$$

Where  $Y$  refers to our outcomes of interest (loneliness, social isolation or depressive symptoms) for individual  $i$  living in local areas under the jurisdiction of HWB  $h$  in year  $t$ ;  $\text{time}$  is a binary variable taking value 1 for the post-Campaign period ( $\geq 2013$ ) and 0 otherwise;  $\text{Treatment}$  takes value 1 for HWBs that adopted the “gold” antilooneliness strategies since 2013 and 0 otherwise; and  $\text{time} * \text{Treatment}$  exposure corresponds to the differences in change between the treated and comparison groups. The coefficient of the interaction term  $\beta_3$  is computed at the mean value of the outcomes and corresponds to the difference in change between treated and comparison groups (the DiD estimate).  $X$  is a vector of controls including participants’ age, age squared, education, employment, income, housing, marital status, any children, physical health.

A key assumption of the difference-in-differences approach, referred to as the parallel trend assumption, is that the comparison group offers a good counterfactual of what the changes in outcomes would have been in the treatment group, in the absence of the antilooneliness campaign. Evidence of the potential validity of this assumption often comes from testing whether treatment and comparison groups exhibited similar trends in the outcomes of interest, in the years preceding the policy change. We tested the parallel trend assumption by examining differences in trends in outcomes in prepolicy years. We reported robust standard errors clustered at the local authority level. All analyses were conducted using Stata (Version 17.0).

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## RESULTS

### Main Analysis

Table 2 presents basic sample characteristics for respondents in ELSA and UKHLS. Approximately 10% of respondents were living in local areas where HWBs adopted an antilooneliness strategy (treatment group), and they were not significantly different from respondents living in local areas where HWBs did not



TABLE 2. Sample characteristics, ELSA and UKHLS<sup>a</sup>

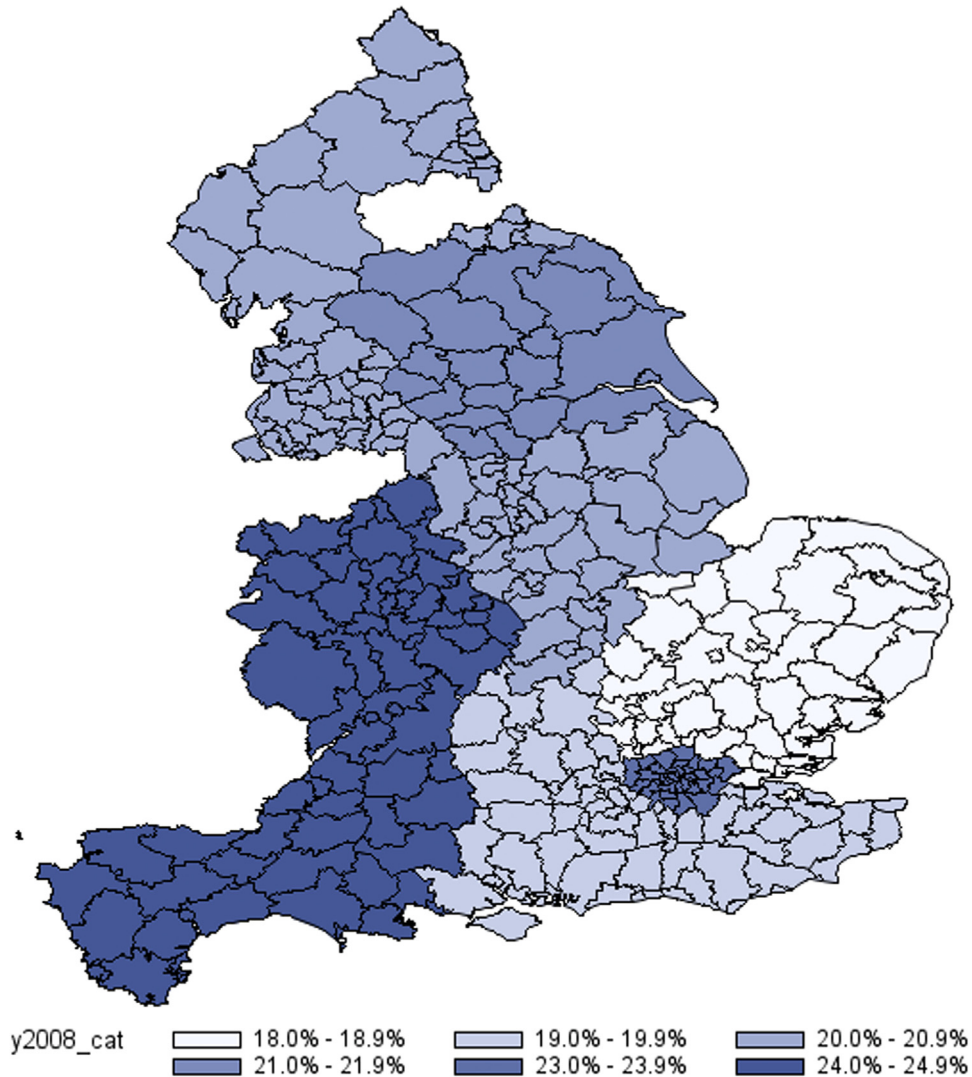
	ELSA			UKHLS		
	Comparison	Treatment	Difference	Comparison	Treatment	Difference
Loneliness (scale)	4.12 (1.49)	4.13 (1.52)	P=0.87 [t(9,346)=-0.17]	-	-	
Lonely (%)	19.39	20.16	P=0.58 [ $\chi^2(1)=0.31$ ]	-	-	
Social isolation (scale)	0.98 (0.64)	0.95 (0.69)	P=0.30 [t(4,492)=1.04]	-	-	
Isolated (%)	1.96	3.06	P=0.12 [ $\chi^2(1)=2.48$ ]	-	-	
CES-D (scale)	1.38 (2.13)	1.45 (2.18)	P=0.33 [t(10,637)=-0.98]	-	-	
CES-D caseness (%)	18.12	19.86	P=0.17 [ $\chi^2(1)=1.86$ ]	-	-	
GHQ-12 scale	-	-		10.3 (4.79)	10.2 (4.53)	P=0.08 [t(23,352)=1.72]
GHQ-12 caseness (%)	-	-		30.36	30.37	P=0.99 [ $\chi^2(1)=0.000$ ]
SF-12 MCS	-	-		52.0 (9.41)	52.4 (9)	P=0.07 [t(23,352)=-1.84]
Family contact (%)	23.5	12.8***	P=0.000 [ $\chi^2(1)=24.4$ ]	96.35	96.71	P=0.55 [ $\chi^2(1)=0.36$ ]
Friendship (%)	19.6	14.6**	P=0.001 [ $\chi^2(1)=11.9$ ]	73.0	74.5	P=0.30 [ $\chi^2(1)=1.01$ ]
Active (%)	33.2	32.3	P=0.66 [ $\chi^2(1)=0.19$ ]	98.5	98.7	P=0.48 [ $\chi^2(1)=0.50$ ]
Volunteering (%)	25.0	24.5	P=0.810 [ $\chi^2(1)=0.06$ ]	79.5	80.6	P=0.67 [ $\chi^2(1)=0.19$ ]
Caregiving	44.0	38.9**	P=0.002 [ $\chi^2(1)=9.44$ ]	27.5	29.2	P=0.15 [ $\chi^2(1)=2.12$ ]
Age (years)	74.0 (7.21)	74.3 (7.14)	P=0.16 [t(10,637)=-1.40]	73.1 (6.44)	74.1*** (6.75)	P=0.000 [t(23,352)=-6.81]
Education (%)		*	P=0.03 [ $\chi^2(2)=6.92$ ]		**	P=0.008 [ $\chi^2(2)=9.77$ ]
Less than GCSE	35.3	35.1		29.7	30.5	
GCSE	48.9	46.0		31.7	34.0	
A-level or more	15.9	19.0		38.6	35.6	
Employment (%)			P=0.34 [ $\chi^2(2)=0.36$ ]		**	P=0.005 [ $\chi^2(2)=10.7$ ]
Employed	7.2	8.0		9.0	7.1	
Retired	86.6	85.0		89.5	91.6	
Unemployed/sick/other reasons out of labour market	6.2	7.0		1.5	1.3	
Household income quartiles (%)		*	P=0.02 [ $\chi^2(3)=9.99$ ]		**	P=0.002 [ $\chi^2(3)=14.4$ ]
<=25%	18.5	19.9		20.3	22.3	
25% to 50%	28.6	32.2		33.7	35.6	
50% to 75%	28.6	27.1		25.3	23.3	
>=75%	24.3	20.1		20.8	18.8	
Owning a house (%)	80.8	81.8	P=0.44 [ $\chi^2(1)=0.59$ ]	80.0	77.9*	P=0.013 [ $\chi^2(1)=6.12$ ]
Marital status (%)		***	P=0.000 [ $\chi^2(3)=26.1$ ]		**	P=0.001 [ $\chi^2(3)=17.1$ ]
Married	59.31	63.16		60.6	59.5	
Single/never married	7.18	9.04		8.5	10.2	
Separated/divorced	10.43	5.86		10.3	8.4	
Widowed	23.07	21.95		20.6	21.9	
Having children (%)	87.6	90.5**	P=0.007 [ $\chi^2(1)=7.25$ ]	74.2	68.3***	P=0.000 [ $\chi^2(1)=38.9$ ]
Poor physical health (%) <sup>a</sup>	21.4	20.4	P=0.448 [ $\chi^2(1)=0.58$ ]	30.8	29.1	P=0.079 [ $\chi^2(1)=3.08$ ]
Number of respondents	3,203	337		5,031	576	
Number of observations	9,632	1,007		20,901	2,453	

Notes: Stars represent statistical significance: \*p < 0.05. \*\*p < 0.01. \*\*\*p < 0.001. Mean values are reported, and standard deviations are included in parentheses. Differences between the comparison and treatment groups are assessed using t-test (for continuous variables) or chi-square test (for categorical variables).

<sup>a</sup>Although we use both the ELSA and UKHLS in the study, the analyses are carried out separately within each dataset. This is mainly due to the differences in the availability of variables and in some cases the specific items or questions in measuring similar variables across datasets. We tried to unify the measurements whenever possible for the purpose of comparison and illustration of sample statistics.

FIGURE 1. Proportion reporting loneliness across regions, 2008

### Proportions of loneliness across regions 2008

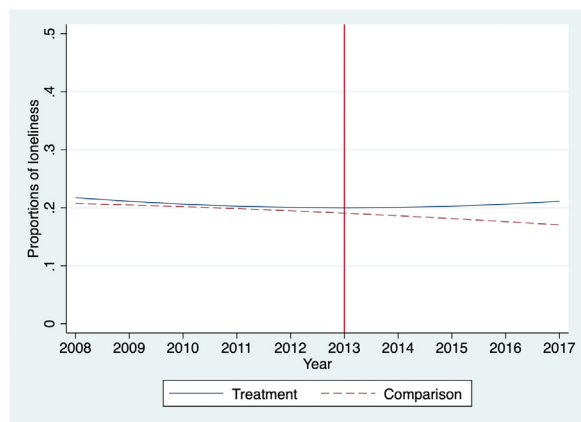


adopt antiloneliness strategy (comparison group) along demographic and socioeconomic characteristics.

Figure 1 shows the frequencies of loneliness across broad regions in the UK. Overall, there was remarkable consistency with roughly 1 person in 5 reporting frequent feelings of loneliness. The proportions were slightly higher in London (23%) and the South West (22%), while that was slightly lower in the East region (17%).

Figure 2 shows trends in UCLA loneliness scores for ELSA participants in our sample from 2008 to 2017. Before 2013, the prevalence of loneliness levels in the treatment and comparison groups were similar. From 2013, while the treatment group experienced a slight increase in the prevalence of loneliness, the comparison group saw a small decrease during the same period. Overall, the trend of loneliness remained constant across the study period before and

**FIGURE 2. Trends of loneliness before and after the campaign in ELSA participants, 2008–2017**

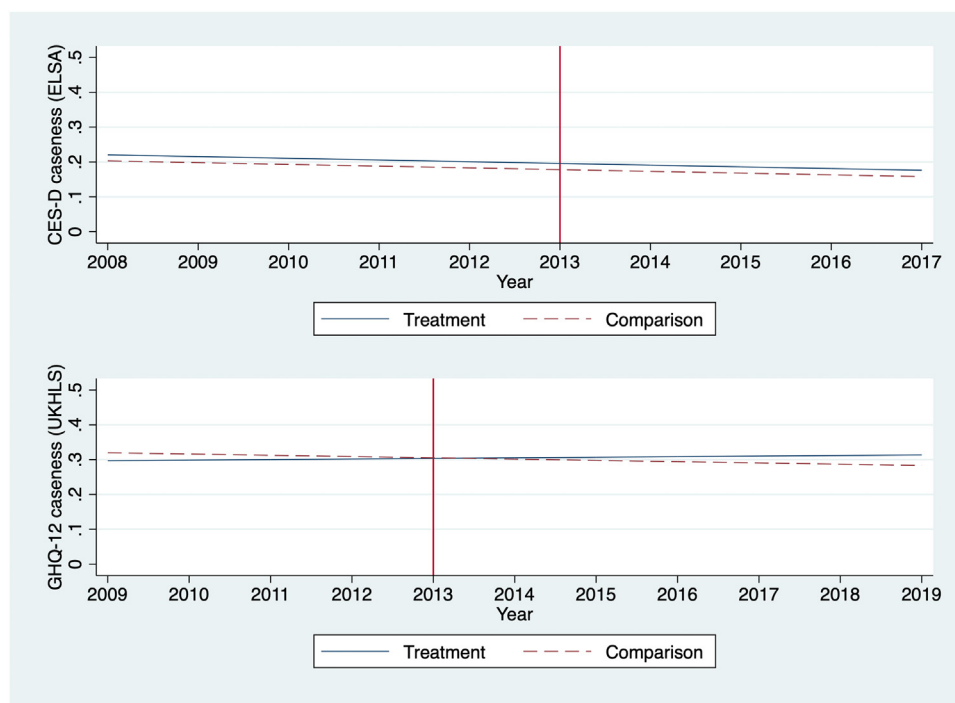


after the campaign. Therefore, [Figure 1](#) indicated little evidence showing that the antiloneliness Campaign generated significant changes in loneliness levels of loneliness among ELSA participants in our sample.

[Figure 3](#) shows prevalence of mental health problems for participants in ELSA (2008–2017) and UKHLS (2009–2019). For both the treatment and comparison groups, we observe little change in mental health before and after the campaign.

We then investigated the impact of the “gold” antiloneliness strategy on levels of loneliness by comparing trends between treatment and comparison local authorities, using a difference-in-differences approach. Results from column 1 in [Table 3](#) show no significant change in the levels of loneliness in the comparison areas before and after the campaign (first row, model (1), [Table 3](#)). The treatment areas had similar levels of loneliness for ELSA participants to that of the comparison areas before the campaign started (second row, model [1], [Table 3](#)). After the establishment of “gold” antiloneliness strategy in the treatment areas, there has been no statistically significant difference in loneliness in the treatment areas relative to the change in the comparison areas (third row, model,<sup>1</sup> [Table 3](#)). In terms of social isolation, although we found some increases in social isolation scales after the campaign, these effects become statistically

**FIGURE 3. Trends of mental health before and after the campaign in ELSA and UKHLS participants, 2008–2019s**





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**TABLE 3. Difference-in-Differences Estimates: Impact of the Campaign on Loneliness and Mental Health in ELSA Participants, 2008-2017**

	Loneliness		Social Isolation		CES-D	
	Scale <sup>1</sup>	Caseness <sup>2</sup>	Scale <sup>3</sup>	Caseness <sup>4</sup>	Scale <sup>5</sup>	Caseness <sup>6</sup>
Time (year >= 2013)	0.030 (0.109) (t = 0.28, p = 0.782)	-0.012 (0.023) (t = -0.52, p = 0.608)	-0.017 (0.053) (t = -0.32, p = 0.752)	0.026 (0.022) (t = 1.16, p = 0.251)	0.158 (0.145) (t = 1.09, p = 0.281)	0.020 (0.027) (t = 0.75, p = 0.456)
Treatment (= exposure to "gold" antiloneliness strategy)	-0.093 (0.048) (t = -1.96, p = 0.055)	-0.025 (0.013) (t = -1.92, p = 0.060)	-0.328*** (0.025) (t = -13.17, p = 0.000)	-0.025*** (0.006) (t = -4.06, p = 0.000)	0.405*** (0.078) (t = 5.16, p = 0.000)	0.066*** (0.010) (t = 6.39, p = 0.000)
Time* Treatment	0.044 (0.085) (t = 0.52, p = 0.605)	0.008 (0.024) (t = 0.31, p = 0.754)	0.135* (0.058) (t = 2.31, p = 0.025)	0.038 (0.020) (t = 1.91, p = 0.062)	0.130 (0.165) (t = 0.78, p = 0.437)	0.005 (0.019) (t = 0.28, p = 0.778)
Degrees of freedom	9,333	9,333	4,494	4,494	10,624	10,624
Number of persons	3,305	3,305	1,883	1,883	3,540	3,540
Number of observations	9,348	9,348	4,494	4,494	10,639	10,639

Notes: Stars represent statistical significance: \*p < 0.05. \*\*p < 0.01. \*\*\*p < 0.001. Unstandardized coefficients are reported. Robust standard errors clustered at the HWB level are included in parentheses. T-tests and p-values for regression coefficients are reported in brackets. Degrees of freedom for t-tests are also reported in a separate row. Covariates include participants' age, age squared, gender, education, employment, household income, housing, marital status, any children, physical health, local authority, and survey wave. Data on social isolation were available from waves 4-7 (2008-2015).

insignificant when measuring social isolation caseness. For CES-D scores, we found no effect of the campaign on CES-D scales (third row, model,<sup>5</sup> Table 3) or caseness of depressive symptoms (third row, model,<sup>6</sup> Table 3).

In Table 4, we present estimates of the impact of the campaign on mental health measured by GHQ (scales and caseness) and SF-12 MCS scores using data from UKHLS. The results from columns 1 and 3 consistently showed that the antiloneliness strategy did not produce significant changes in mental health in older people.

Table 5 explores the impact of the campaign on specific dimensions of social participation that might not be captured by summary measures, including

contact with family and friends, social activity, volunteering, unpaid help, and care provision. These results revealed no evidence that the local authorities with a "gold" antiloneliness strategy had better outcomes than those that did not implement any strategies to address loneliness.

## Heterogeneity

To assess heterogeneous effects of the antiloneliness campaign, we interacted the DiD estimator with participants' education and income. Table 6 reports estimates by educational level and income in ELSA and UKHLS. In Panel A of column 1, we saw the DiD estimator significantly varied by participants'

**TABLE 4. Difference-in-Differences Estimate: Impact of the Campaign on Mental Health in UKHLS Participants, 2009-2019**

	GHQ-12		SF-12 MCS Scale
	Scale	Caseness	
Time (year >= 2013)	0.154 (0.177) (t = 0.87, p = 0.387)	0.002 (0.018) (t = 0.09, p = 0.927)	0.037 (0.312) (t = 0.12, p = 0.906)
Treatment (= exposure to "gold" antiloneliness strategy)	0.264* (0.131) (t = 2.02, p = 0.045)	-0.008 (0.012) (t = -0.66, p = 0.512)	-0.903** (0.300) (t = -3.01, p = 0.003)
Time* Treatment	0.106 (0.236) (t = 0.45, p = 0.654)	0.032 (0.022) (t = 1.48, p = 0.141)	-0.548 (0.542) (t = -1.01, p = 0.314)
Degrees of freedom	23,339	23,339	23,339
Number of persons	5,607	5,607	5,607
Number of observations	23,354	23,354	23,354

Notes: Stars represent statistical significance: \*p < 0.05. \*\*p < 0.01. \*\*\*p < 0.001. Unstandardized coefficients are reported. Robust standard errors clustered at the HWB level are included in parentheses. T-tests and p-values for regression coefficients are reported in brackets. Degrees of freedom for t-tests are also reported in a separate row. Covariates include participants' age, age squared, education, employment, household income, housing, marital status, any children, physical health, local authority, and survey wave.

**TABLE 5. Difference-in-Differences Estimates: Impact of the Campaign on Social Participation in ELSA (2008–2017) and UKHLS (2009–2019) Participants**

	Family		Friendship		Social Activity		Volunteering		Unpaid Help and Caregiving	
	ELSA	UKHLS	ELSA	UKHLS	ELSA	UKHLS	ELSA	UKHLS	ELSA	UKHLS
Time (year) >= 2013	-0.030 (0.030)	0.014 (0.023)	0.027 (0.027)	0.002 (0.070)	0.017 (0.015)	-0.000 (0.001)	0.054 (0.033)	-0.003 (0.035)	0.077* (0.031)	0.031 (0.021)
Treatment (= exposure to "gold" anti loneliness strategy)	(t = -0.98, p = 0.33)	(t = 0.60, p = 0.550)	(t = 1.00, p = 0.323)	(t = 0.03, p = 0.974)	(t = 1.02, p = 0.313)	(t = -0.08, p = 0.933)	(t = 1.65, p = 0.104)	(t = -0.07, p = 0.942)	(t = 2.49, p = 0.016)	(t = 1.49, p = 0.139)
	0.002 (0.015)	0.012 (0.009)	-0.101** (0.018)	-0.046** (0.013)	-0.052** (0.015)	0.003 (0.003)	0.103** (0.025)	-0.095** (0.029)	-0.125** (0.019)	-0.075** (0.013)
	(t = 0.16, p = 0.871)	(t = 1.38, p = 0.169)	(t = -5.68, p = 0.000)	(t = -3.67, p = 0.000)	(t = -3.44, p = 0.001)	(t = 1.08, p = 0.282)	(t = 4.14, p = 0.000)	(t = -3.31, p = 0.001)	(t = -6.59, p = 0.000)	(t = 5.58, p = 0.000)
Time* Treatment	-0.004 (0.028)	0.001 (0.015)	0.058 (0.030)	0.031 (0.025)	0.040 (0.040)	-0.003 (0.005)	-0.009 (0.040)	-0.053 (0.060)	-0.078 (0.041)	0.006 (0.023)
Degrees of freedom	8,263	10,813	8,536	10,144	6,279	22,216	4,327	2,357	10,621	16,956
Number of persons	3,116	4,504	3,190	5,067	3,385	5,553	2,584	1,257	3,539	4,406
Number of observations	8,278	10,828	8,551	10,159	6,294	22,231	4,342	2,372	10,636	16,971

Notes: Stars represent statistical significance: \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001. Unstandardized coefficients are reported. Robust standard errors clustered at the HWB level are included in parentheses. t tests and p-values for regression coefficients are reported in brackets. Degrees of freedom for t-tests are also reported in a separate row. Covariates in ELSA and UKHLS include participants' age, age squared, gender, education, employment, household income, housing, marital status, any children, physical health, local authority, and survey wave. Discrepancies of sample sizes among these outcomes were mainly due to data availability.

education (third row, model,<sup>1</sup> Table 6). In particular, the campaign reduced loneliness for higher educated (i.e., at least A-level or equivalent) older adults by 0.3 units of the loneliness scale (B = 0.134–0.397 = -0.263, F(1,50) = 12.82, p = 0.0008). Panel B of column 1 shows that the campaign impact on loneliness was also significantly different based on household income (sixth row, model,<sup>1</sup> Table 6). Those at the top quartile of the income distribution experienced a significant decrease of 0.2 units in the loneliness scale (B = 0.151–0.363 = 0.212, F(1,50) = 4.56, p = 0.0377). Columns 2–5 shows that there were no differences in the impact of the campaign on social isolation scale, CES-D levels, GHQ levels, or SF-12 MCS by either education or income. We also interacted the DiD estimator with a range of individual characteristics, including age, gender, education, employment, income, marital status, number of children, physical health, and housing tenure. The results (Appendix Table A1) indicate no statistical significance of the interaction terms for either loneliness or mental health outcomes.

Heterogeneity analyses for social participation outcomes by education and income are summarized in Appendix Table A2. We found no consistent pattern of heterogeneity with most estimates, suggesting no impact of the campaign in most outcomes. The exception was for participation in activities (e.g., educational, sports or arts), which increased in response to the campaign among higher educated people. However, there was no change in other aspects of social participation. We also conducted heterogeneity analyses by gender, marriage, number of children, housing, and physical health, but found no heterogeneous effects and no evidence of impact of the campaign on either outcome (results available upon request).

### Sensitivity Analyses

In sensitivity analysis, we used an alternative treatment definition and sample. First, instead of designating 2013 as the first year of exposure of the policy, we exclude ELSA and UKHLS participants interviewed in 2012–2013. This is because some HWBs may have begun operating in shadow form 2012, although the majority of HWBs in local areas reached statutory function in 2013. The results (Appendix Table A3) were consistent with the main analyses. Second, we expanded our sample to all nine regions of England, including five regions that were previously excluded

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**TABLE 6. Difference-in-Differences Estimate: Impact of the Campaign on Loneliness and Mental Health in ELSA (2008–2017) and UKHLS (2009–2019) Participants, by Education and Income**

	Loneliness	Social Isolation	CES-D	GHQ-12	SF-12 MCS
<b>Panel A: By Education</b>					
Education (=A-level or above)	-0.113 (0.058) (t = -1.95, p = 0.057)	0.157*** (0.036) (t = 4.41, p = 0.000)	-0.110 (0.077) (t = -1.43, p = 0.160)	-0.120 (0.114) (t = -1.05, p = 0.297)	0.782*** (0.220) (t = 3.56, p = 0.001)
Time* Treatment	0.134 (0.103) (t = 1.31, p = 0.197)	0.108 (0.073) (t = 1.48, p = 0.145)	0.114 (0.180) (t = 0.63, p = 0.529)	0.196 (0.272) (t = 0.72, p = 0.472)	-0.471 (0.542) (t = -0.87, p = 0.387)
Time* Treatment*Education	-0.379*** (0.104) (t = -3.65, p = 0.001)	0.071 (0.120) (t = 0.60, p = 0.554)	0.114 (0.143) (t = 0.80, p = 0.426)	-0.243 (0.271) (t = -0.90, p = 0.371)	-0.228 (0.469) (t = -0.49, p = 0.628)
<b>Panel B: by income</b>					
Income (=Top 25%)	-0.082 (0.068) (t = 1.96, p = 0.055)	0.065 (0.044) (t = 1.49, p = 0.143)	-0.390*** (0.118) (t = -3.32, p = 0.002)	-0.675*** (0.181) (t = -3.72, p = 0.000)	1.108** (0.344) (t = 3.23, p = 0.002)
Time* Treatment	0.151 (0.077) (t = -1.21, p = 0.232)	0.171 (0.098) (t = 1.74, p = 0.088)	0.174 (0.179) (t = 0.97, p = 0.336)	0.067 (0.255) (t = 0.26, p = 0.792)	-0.372 (0.585) (t = -0.64, p = 0.526)
Time* Treatment*Income	-0.363*** (0.061) (t = -5.95, p = 0.000)	-0.099 (0.157) (t = -0.63, p = 0.529)	-0.161 (0.140) (t = -1.15, p = 0.257)	0.173 (0.301) (t = 0.57, p = 0.566)	-0.786 (0.493) (t = -1.60, p = 0.113)
Degrees of freedom	9,333	4,479	10,624	2,339	2,339
Number of persons	3,305	1,883	3,540	5,608	5,608
Number of observations	9,348	4,494	10,639	23,354	23,354

Notes: Stars represent statistical significance: \*p < 0.05. \*\*p < 0.01. \*\*\*p < 0.001. Unstandardized coefficients are reported. Robust standard errors clustered at the HWB level are included in parentheses. T-tests and p-values for regression coefficients are reported in brackets. Degrees of freedom for t-tests are also reported in a separate row. Covariates include participants' age, age squared, gender, education, employment, household income, housing, marital status, any children, physical health, local authority, and survey wave.

**TABLE 7. Common Trend Assumption Test for Loneliness, Social Isolation, and Mental Health in ELSA (2008–2012) and UKHLS (2009–2012) Participants**

	ELSA			UKHLS	
	Loneliness	Social Isolation	CES-D	GHQ-12	SF-12 MCS
2010	-0.032 (0.044) (t = -0.73, p = 0.470)	0.200*** (0.020) (t = 10.05, p = 0.000)	0.051 (0.061) (t = 0.83, p = 0.408)	0.592*** (0.124) (t = 4.76, p = 0.000)	-1.000*** (0.270) (t = -3.71, p = 0.000)
2011	-	-	-	-0.160 (0.134) (t = -1.20, p = 0.232)	-0.865*** (0.245) (t = -3.53, p = 0.001)
2012	-0.033 (0.039) (t = -0.86, p = 0.393)	0.211*** (0.026) (t = 8.14, p = 0.000)	-0.192*** (0.052) (t = -3.71, p = 0.001)	-0.329** (0.121) (t = -2.71, p = 0.008)	-0.208 (0.241) (t = -0.87, p = 0.388)
Treatment (= exposure to "gold" antilongevity strategy)	-0.085 (0.162) (t = -0.52, p = 0.604)	-0.052 (0.065) (t = -0.79, p = 0.431)	-0.015 (0.181) (t = -0.08, p = 0.934)	-0.115 (0.241) (t = -0.48, p = 0.633)	0.754 (0.534) (t = 1.41, p = 0.160)
2010 * Treatment	0.125 (0.160) (t = 0.78, p = 0.439)	-0.064 (0.080) (t = -0.79, p = 0.431)	-0.113 (0.263) (t = -0.43, p = 0.670)	-0.450* (0.201) (t = -2.24, p = 0.027)	0.305 (0.510) (t = 0.60, p = 0.551)
2011 * Treatment	-	-	-	-0.201 (0.393) (t = -0.51, p = 0.610)	0.103 (0.731) (t = 0.14, p = 0.888)
2012 * Treatment	0.143 (0.151) (t = 0.95, p = 0.349)	-0.005 (0.103) (t = -0.05, p = 0.960)	0.379 (0.232) (t = 1.63, p = 0.109)	0.184 (0.313) (t = 0.59, p = 0.557)	-0.973 (0.566) (t = -1.72, p = 0.088)
Degrees of freedom	5,528	3,322	6,326	10,031	10,031
Number of persons	2,663	1,651	2,892	4,281	4,281
Number of observations	5,531	3,325	6,329	10,034	10,034

Notes: Stars represent statistical significance: \*p < 0.05. \*\*p < 0.01. \*\*\*p < 0.001. Unstandardized coefficients are reported. Robust standard errors clustered at the HWB level are included in parentheses. T-tests and p-values for regression coefficients are reported in brackets. Degrees of freedom for t-tests are also reported in a separate row.

because none of their local authorities had a “gold” antiloneliness strategy in place throughout the study period. This substantially increased the number of people in our comparison group. Results were also consistent with our main analysis and indicated no beneficial impact of the antiloneliness strategies on outcomes (Appendix Table A4).

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### COMMON TREND ASSUMPTION TEST

We tested the parallel trend assumption in Table 7 by examining differences in trends in loneliness, social isolation and depressive symptoms for treatment and comparison groups prior to the antiloneliness strategy. For all outcomes except GHQ, there were no significant differences in trends between treatment and comparison groups in either ELSA (2008–2012) or UKHLS (2009–2012). Overall, these results yield support for the common trend assumption.

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### CONCLUSIONS

Our study examined the impact on loneliness and mental health of the antiloneliness strategy developed at the local authority level in England, lobbied by a nationwide antiloneliness campaign targeted towards older people. We found no evidence that the antiloneliness Campaign led to a significant decrease in loneliness or mental health, and there was little change in social participation among older people exposed to the campaign. Heterogeneity analysis indicated some impact of the campaign in reducing loneliness and increasing social activities for older adults with higher education and income, but these changes did not translate into significant improvement in their mental health.

To our knowledge, no prior study has attempted to estimate the impact of large-scale antiloneliness programmes or interventions on loneliness and mental health among older people. Existing experimental or quasi-experimental studies mainly relied on small samples of older people and the quality of findings was mixed.<sup>20–22</sup> Studies evaluating the impact of different antiloneliness interventions have yielded mixed results.<sup>23</sup> A systematic review of “befriending” interventions assessed through randomized controlled trials (RCTs) or quasi-experimental designs

reported overall improvements in loneliness and psychological wellbeing outcomes, but effects were small and not significant for single studies.<sup>37</sup> Another umbrella review of RCTs identified social cognition interventions as useful to address loneliness in older people, but the effects of these RCTs are generally small.<sup>38</sup> Studies that have found effects are focused on individual-level interventions, rather than population-wide interventions. For example, an RCT found that mindfulness-based stress reduction program participation reduced feelings of loneliness among older adults.<sup>39</sup>

One reason that accounts for the observed reductions in loneliness and increases in social participation among highly educated or high-income older people may be due to the “intellectual” nature of activities carried out as part of the antiloneliness programmes. Another potential explanation is that highly educated or high-income individuals may have more freedom in time allocation which enables them to benefit more from an antiloneliness campaign, comparing to their peers. While we have no direct measures in our data for formal testing, we note that some of the activities in local areas with “gold” antiloneliness strategies (Table 1) echo our assumptions, including promoting mind-set change regarding independence, self-reliance, and self-care among older people and local communities; promoting lifestyle change related to health behavior, physical and social activity; promoting knowledge related to reducing loneliness and isolation, such as peer support, community emotional resilience.

Our study adds to the debate by suggesting that a nationwide antiloneliness Campaign does not seem to lead to improved outcomes of loneliness and mental health for older people. We identify three possible explanations. First, the intensity and level of investment in antiloneliness activities may be too low in most local authorities and insufficient to generate change. Second, a public campaign might operate through a complex chain of effects that involve increasing awareness and identification, which is then followed by adoption of concrete strategies by local authorities to generate behavioral change among older people, their family and friends. These changes will need to be sustained over time in order to generate true changes in feelings of loneliness. As a result, the UK antiloneliness Campaign might require long periods of exposure to generate measurable changes in outcomes. Third, the limited improvement in older

people's familial and social relationships suggests that the "structural" causes of loneliness remain and may not be altered through a public loneliness campaign, as it may relate to long-standing living arrangements, patterns of social interaction and changes in family composition, which may be difficult to change through a local authority campaign.

### **Strength and Limitations**

To our knowledge, ours is the first study to evaluate the impact of a large-scale antiloneliness campaign on outcomes of loneliness and mental health for older people. Drawing on two longitudinal datasets and a difference-in-differences approach, we provided robust evidence that might inform policy-making. Our study had a few main limitations. First, we focused on the early years of the campaign, therefore we were unable to capture the potential development of the antiloneliness strategies at the local authority level beyond our study period. Our categorization of the antiloneliness strategies might also be crude to reflect the various dimensions of the campaign. Another potential concern is that local authorities that chose to adopt a gold strategy maybe different from those adopting less aggressive strategies. We did not have information on the intentions and motivations of the boards, but evidence suggests that drivers of the decision to adopt a golden strategy were associated with factors related to the leadership of the person in charge of the board, feedback from community members, or availability of evidence. These differences highlight the importance of our difference-in-difference approach, which compare changes rather than levels of outcomes.

Third, our loneliness measurement, although widely used and valid, might not fully capture the complex individual experiences of feeling lonely, due to the chronicity and changing nature of loneliness.<sup>15</sup> Similarly, the measurements of social isolation and participation were not necessarily strong predictors of loneliness which is also dependent on individual expectations and standards.<sup>40</sup> On the other hand, we acknowledge that these challenges related to measurements are often inherent to longitudinal studies that aim to capture a population-wide change in a certain outcome, despite the general validity and usefulness of the measurements. While a 4-item version of

the UCLA Loneliness Scale is sometimes preferred,<sup>41</sup> we note that our measure of a 3-item version has been widely used in earlier studies based on ELSA<sup>42-44</sup> as well as other databases.<sup>45-47</sup> In addition, we carried out a series of heterogeneity analyses, which may increase the risks of Type I error (false-positive). These heterogenous effects should therefore be interpreted with caution.

A further limitation of our study is that we assess the overall impact of a high-level policy change (the antiloneliness campaign), rather than to assess the impact of specific interventions, for which different types of design are required (e.g., randomized controlled trials). Despite this, our study adds value to knowledge of evaluations of nationwide public health interventions, and our results of very limited or null effects of the Campaign does illustrate the limitation of a public campaign of awareness as a single strategy to address loneliness. These findings provide important evidence on the overall impact of a national policy (campaign) on loneliness, which is meaningful for both the scientific community and policymakers interested in designing future strategies or interventions. Future planning may benefit from considerations such as allocating more resources for loneliness campaigns at the local level, encouraging the use of evidence-based approaches, developing manuals or instruments for implementation, or carrying out a different national strategy than that carried out as part of the antiloneliness national campaign. In addition, the reviewer's comment has made us aware of the importance of providing more information about the nature of the campaign, particularly in "golden" local authorities. Also, in response to comments by reviewer 3, we have now expanded substantially the discussion to provide more information about the nature of the campaigns. In particular, we have created a new table (Table 1) that clearly outlines the action plans and activities in local areas with "gold" antiloneliness strategies. These action plans and activities were divided into five categories: agenda setting; data collection and sharing; behavior change; education and collaborations; and support and activities. For each of these broader dimensions, we have provided details on the objectives and/or activities undertaken in "gold" areas. We hope that this table will provide the reviewer and the reader with more detailed into the definition of the policy we are evaluating.



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## CONCLUSION

Our results suggest that the antiloneliness campaign in the UK had limited overall effects on levels of loneliness and mental wellbeing among older people. These findings suggest that existing local strategies to reduce loneliness may not address the “structural” cases of loneliness, and they may need to be revised or expanded in order to generate significant changes in outcomes. Further research is required to identify public health or community-based intervention that may be more effective to generate changes in behavior, and which may be more effective to reduce feelings of loneliness among older people.

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## AUTHOR CONTRIBUTIONS

LL contributed to the study conceptualization, methodology, formal analysis, visualization, writing of the original draft, reviewing and editing of the manuscript. LC contributed to the study conceptualization, methodology, and critical review of the manuscript. ER contributed to the study conceptualization and critical review of the manuscript. MA contributed to the study conceptualization, methodology, visualization, reviewing and editing of the manuscript, and funding acquisition.

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## DATA STATEMENT

The data has not been previously presented orally or by poster at scientific meetings.

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## DISCLOSURES

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## SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at <https://doi.org/10.1016/j.jagp.2023.10.007>.

## References

- de Jong-Gierveld J, van Tilburg TG, Dykstra PA: Loneliness and social isolation. In: Cambridge Handbook of Personal Relationships; 485–500. Cambridge University Press. Cambridge, UK
- Peplau LA, Perlman D: Perspectives on Loneliness. In: Peplau LA, Perlman D, eds. Loneliness: A sourcebook of current theory, research and therapy, New York, United States: John Wiley & Sons, 1982:1–18
- Luanagh C, Lawlor BA: Loneliness and the health of older people. *Int J Geriatr Psychiatry* 2008; 23(12):1213–1221
- DfDCMS. Department for Digital, culture, media & sport. Official statistics: wellbeing and loneliness - community life survey 2020/21. July 2021. London, UK. <https://www.gov.uk/government/statistics/community-life-survey-202021-wellbeing-and-loneliness/wellbeing-and-loneliness-community-life-survey-202021>.
- Sandu V, Leichsenring K, Zólyomi E. Social isolation and loneliness among older people in Europe: Evidence, policies and interventions. European Center for Social Welfare Policy and Research. <https://www.eurocentre.org/projects/detail/4302>. 2022.
- Fakoya OA, McCorry NK, Donnelly M: Loneliness and social isolation interventions for older adults: a scoping review of reviews. *BMC public health* 2020; 20(1):1–14
- Leigh-Hunt N, Bagguley D, Bash K, et al: An overview of systematic reviews on the public health consequences of social isolation and loneliness. *Public Health* 2017; 152:157–171
- Tanskanen J, Anttila T: A prospective study of social isolation, loneliness, and mortality in Finland. *Am J Public Health* 2016; 106(11):2042–2048

## *Has the UK Campaign to End Loneliness Reduced Loneliness*

9. Holt-Lunstad J, Smith TB, Layton JB: Social relationships and mortality risk: a meta-analytic review. *PLoS Med* 2010; 7(7): e1000316
10. Nummela O, Seppänen M, Uutela A: The effect of loneliness and change in loneliness on self-rated health (SRH): a longitudinal study among aging people. *Arch Gerontol Geriatr* 2011; 53(2):163-167
11. Shankar A, Hamer M, McMunn A, et al: Social isolation and loneliness: relationships with cognitive function during 4 years of follow-up in the English Longitudinal Study of Ageing. *Psychosom Med* 2013; 75(2):161-170
12. Kuiper JS, Zuidersma M, Voshhaar RCO, et al: Social relationships and risk of dementia: a systematic review and meta-analysis of longitudinal cohort studies. *Ageing Res Rev* 2015; 22:39-57
13. Cacioppo JT, Hawkey LC, Thisted RA: Perceived social isolation makes me sad: 5-year cross-lagged analyses of loneliness and depressive symptomatology in the Chicago Health, Aging, and Social Relations Study. *Psychol Aging* 2010; 25(2):453
14. Sjöberg L, Östling S, Falk H, et al: Secular changes in the relation between social factors and depression: a study of two birth cohorts of Swedish septuagenarians followed for 5 years. *J Affect Disord* 2013; 150(2):245-252
15. Smith KJ, Victor C: Typologies of loneliness, living alone and social isolation, and their associations with physical and mental health. *Ageing & Society* 2019; 39(8):1709-1730
16. Cornwell EY, Waite IJ: Social disconnectedness, perceived isolation, and health among older adults. *J Health Soc Behav* 2009; 50(1):31-48
17. Holt-Lunstad J. Social isolation and health. *Health affairs*. June 2020: <https://doi.org/10.1377/hpb20200622.253235>
18. WHO. World Health Organisation. Decade of healthy ageing 2020-2030: plan of action Available at: <https://www.who.int/publications/m/item/decade-of-healthy-ageing-plan-of-action>. Accessed December 14, 2020.
19. Hagan R, Manktelow R, Taylor BJ, et al: Reducing loneliness amongst older people: a systematic search and narrative review. *Ageing Ment Health* 2014; 18(6):683-693
20. Gardiner C, Geldenhuys G, Gott M: Interventions to reduce social isolation and loneliness among older people: an integrative review. *Health Soc Care Community* 2018; 26(2):147-157
21. National Academies of Sciences, Engineering, and Medicine: Social isolation and loneliness in older adults: Opportunities for the health care system. Washington, D.C., United States: National Academies Press, 2020
22. Fried L, Prohaska T, Burholt V, et al: A unified approach to loneliness. *Lancet North Am Ed* 2020; 395(10218):114
23. von Soest T, Luhmann M, Hansen T, et al: Development of loneliness in midlife and old age: its nature and correlates. *J Pers Soc Psychol* 2020; 118(2):388
24. Cupitt S: The Campaign to End Loneliness evaluation: Health and Wellbeing Boards' Uptake of Campaign Messages. London: Charities Evaluation Services, 2013
25. Dimick JB, Ryan AM: Methods for evaluating changes in health care policy: the difference-in-differences approach. *JAMA* 2014; 312(22):2401-2402
26. Banks J, Batty G, David BJ, et al: English Longitudinal Study of Ageing: Waves 0-9, 1998-2019. 37th ed UK Data Service, 2021; doi:10.5255/UKDA-SN-5050-24
27. UfE. University of Essex, Institute for Social and Economic Research: Understanding Society: Waves 1-12, 2009-2021 and Harmonised BHPS: Waves 1-18, 1991-2009. 17th ed UK Data Service, 2022;doi:10.5255/UKDA-SN-6614-18
28. Russell D, Peplau LA, Ferguson ML: Developing a measure of loneliness. *J Pers Assess* 1978; 42(3):290-294
29. Shankar A, McMunn A, Banks J, et al: Loneliness, social isolation, and behavioral and biological health indicators in older adults. *Health Psychol* 2011; 30(4):377
30. Broadhead WE, Gehlbach SH, DeGruy FV, Kaplan BH: Functional versus structural social support and health care utilization in a family medicine outpatient practice. *Medical care* 1989; 27(3):221-233
31. Coyle CE, Dugan E: Social isolation, loneliness and health among older adults. *J Aging Health* 2012; 24(8):1346-1363
32. Valtorta NK, Kanaan M, Gilbody S, et al: Loneliness, social isolation and social relationships: what are we measuring? A novel framework for classifying and comparing tools. *BMJ Open* 2016; 6(4):e010799
33. Radloff LS: The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Measurement* 1977; 1(3):385-401
34. Sawyer Radloff L, Teri L: Use of the center for epidemiological studies-depression scale with older adults. *Clin Gerontol* 1986; 5(1-2):119-136
35. Goldberg DP, Gater R, Sartorius N, et al: The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychol Med* 1997; 27(1):191-197
36. Dunning T: *Natural Experiments in the Social Sciences: A Design-Based Approach*. Cambridge: Cambridge University Press, 2012
37. Siette J, Cassidy M, Priebe S: Effectiveness of befriending interventions: a systematic review and meta-analysis. *BMJ Open* 2017; 7(4):e014304
38. Jarvis M-A, Padmanabhanunni A, Balakrishna Y, et al: The effectiveness of interventions addressing loneliness in older persons: an umbrella review. *Int J Afr Nurs Sci* 2020; 12:100177
39. Creswell JD, Irwin MR, Burklund LJ, et al: Mindfulness-based stress reduction training reduces loneliness and pro-inflammatory gene expression in older adults: a small randomized controlled trial. *Brain Behav Immun* 2012; 26(7):1095-1101
40. Gierveld JdJ, Van Tilburg TG, Dykstra PA: In: Vangelisti AL, Perlman D, eds. *New ways of theorizing and conducting research in the field of loneliness and social isolation*. The Cambridge handbook of personal relationships (2nd ed, pp 391-404), Cambridge, UK: Cambridge University Press, 2018
41. Russell D, Peplau LA, Cutrona CE: The revised UCLA Loneliness Scale: concurrent and discriminant validity evidence. *J Pers Soc Psychol* 1980; 39(3):472
42. Hawkey LC, Steptoe A, Schumm LP, et al: Comparing loneliness in England and the United States, 2014-2016: differential item functioning and risk factor prevalence and impact. *Soc Sci Med* 2020; 265:113467
43. Davies K, Maharani A, Chandola T, et al: The longitudinal relationship between loneliness, social isolation, and frailty in older adults in England: a prospective analysis. *The Lancet Healthy Longevity* 2021; 2(2):e70-ee7
44. Yin J, Lassale C, Steptoe A, et al: Exploring the bidirectional associations between loneliness and cognitive functioning over 10 years: the English longitudinal study of ageing. *Int J Epidemiol* 2019; 48(6):1937-1948
45. Raymo JM, Wang J: Loneliness at older ages in the United States: lonely life expectancy and the role of loneliness in health disparities. *Demography* 2022; 59(3):921-947
46. Anderssen N, Sivertsen B, Lønning KJ, et al: Life satisfaction and mental health among transgender students in Norway. *BMC public health* 2020; 20(1):1-11
47. Jakobsen IS, Madsen LMR, Mau M, et al: The relationship between resilience and loneliness elucidated by a Danish version of the resilience scale for adults. *BMC psychology* 2020; 8(1):1-10