Supporting Information for

Mental health, financial, and social outcomes among older adults with probable COVID-19 infection: A longitudinal cohort study.

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Methods

Sample

The English Longitudinal Study of Ageing (ELSA) is a longitudinal cohort study of men and women aged 50 years and older living in England. The study commenced in 2002/03 (wave 1) with a nationally representative sample of 12,099 participants and their partners, drawn from the Health Survey for England (HSE). To record changes in their health, social, and economic circumstances, since the commencement of the study these participants have been repeatedly interviewed at biennial interviews (i.e. waves) using face-to-face computer-assisted personal interviews and self-completion questionnaires. The most recent full wave of data collection was carried out in 2018/19 (wave 9). The study sample is periodically refreshed with new participants to maintain its original size and representativeness.

Measures

Mental health outcomes

Depression was ascertained using the 8-item Centre for Epidemiological Studies Depression (CESD-8) scale(1). We used a cut-off point of four or more symptoms to identify likely cases of clinical depression(2). Anxiety was ascertained using the 7-item Generalised Anxiety Disorder scale (GAD-7)(3), with a threshold score of 10 or greater to identify likely cases of generalised anxiety disorder (GAD). Quality of life (QoL) was evaluated through the 12-item Control, Autonomy, Self-realisation, and Pleasure (CASP) scale(4). The resulting item scores were summed to create a QoL index where higher scores indicate poorer wellbeing (range: 1-48). Loneliness was measured using the 3-item revised University of California (UCLA) Loneliness scale(5) and an additional item asking participants how often they feel lonely. The item scores were summed to derive a total score, with higher values indicating greater loneliness (range: 1-12).

Covariates

Pre-pandemic mental health, social contact, and financial difficulties were included as covariates to account for differences between people with and without probable COVID-19 infection before the onset of the pandemic. Pre-pandemic mental health and social interactions were measured at the most recent pre-pandemic assessment available for each participant (i.e. wave 9). Assessments of depression, QoL, and loneliness in earlier waves of ELSA were conducted using the same scales as those included in the COVID-19 substudy. The GAD-7 was not administered in previous waves; to adjust the analyses for anxiety levels pre-pandemic we used the Office for National Statistics (ONS) anxiety scale administered in wave 9. The anxiety scale is one of the four wellbeing measures that have been developed by the Office for National Statistics (ONS) to assess various domains of personal wellbeing, including evaluative, eudemonic, and affective experience(6). Participants were asked to respond to the following question: “On a scale where 0 is ‘not at all anxious’ and 10 is ‘completely anxious’, overall, how anxious did you feel yesterday?”. The resulting scores range between 0 and 10, with higher scores indicating greater anxiety levels. Further, as the social contact measures of the COVID-19 substudy differed from those included in earlier waves, the analyses of social interactions were adjusted for an index of social isolation combining information on whether participants had infrequent contact with family and friends and were not involved in local organisations at wave 9. Social isolation before the onset of the pandemic was measured using
four indicators that were obtained from the wave 9 survey. These included having less than monthly contact (face-to-face, telephone, or writing/email) with (i) children, (ii) other family, and (iii) friends, and (iv) no membership of nine types of organisation (i.e. a political party, trade union, or environmental group; a tenants groups, resident groups, neighbourhood watch; a church or other religious group; a charitable association; an education, arts or music groups or evening class; a social club; a sports clubs, gym, or exercise class; any other organisation, club or society). This measure of social isolation has been previously used in earlier ELSA studies(7, 8). Pre-pandemic financial hardship was measured based on the participants’ ratings of their financial situation in the three months prior to the COVID-19 outbreak (i.e. “living comfortably”, “doing all right”, “just about getting by”, “finding it quite difficult”, or “finding it very difficult”). Covariates obtained from the first COVID-19 assessment included sex, age (52-59, 60-74, and 75+ years), whether living alone, work status (employed, retired, other not working), and whether vulnerable to COVID-19 infection (i.e. participants advised by the NHS or their general practitioner that they are at risk of severe illness if they catch COVID-19 and encouraged to stay at home and avoid face-to-face contact). The analyses of the outcomes at the second COVID-19 assessment also accounted for whether participants reported testing positive or being hospitalised for COVID-19 in Nov-Dec 2020 (information on COVID-19 symptoms was not collected in the second COVID-19 assessment). Additional covariates taken from the wave 9 survey were wealth and limiting long-standing illness. Wealth was used as an indicator of the participant’s socioeconomic resources, including financial, housing, and physical wealth (such as land, business wealth, and jewellery) but excluding pension wealth, and it was divided into tertiles for the purpose of the analysis (i.e. low, medium, and high wealth). Participants were classified as having a limiting long-standing illness if they reported having a long-standing illness, disability, or infirmity that limited their activities in any way. The variables sex, age, living alone, work status, and wealth were also considered as possible effect modifiers in the analysis in order to explore whether the psychosocial impact of COVID-19 infection might vary across distinct sociodemographic groups.

**Statistical analyses**

*Multiple imputation of missing data*

The percentage of missing data in the variables ranged between 0 and 6%. In addition, due to a coding error, for around 75% of the sample the last item of the CESD-8 questionnaire was not administered at the first COVID-19 wave. This type of missing data is classified as missing completely at random (MCAR), and can be dealt efficiently with multiple imputation(9). We used multiple imputation by chained equations with all variables of the analysis included as predictors of the imputation models as well as auxiliary variables. We created twenty imputed datasets. The distribution of the variables in the imputed and observed data was similar, suggesting that the MI procedure produced accurate model estimates. In regression analyses, we pooled the regression estimates across the imputed datasets using Rubin’s rules(10). For the IPTW analyses, propensity score estimation and weighting were performed within each imputed dataset, and the regression estimates across the weighted datasets were then pooled together – i.e. ‘within’ approach(11). We favoured this approach over the ‘across’ approach (i.e. propensity scores are averaged across the imputed datasets, and weighting within each dataset is performed using this averaged measure) because the latter has been shown to have inferior statistical performance compared with the ‘within’ approach across different scenarios(12, 13).
**Sensitivity analyses**

The following analyses were conducted:

- We applied inverse probability of treatment weighting (IPTW) to account for measured confounding factors in the associations between probable COVID-19 infection and the outcomes.
- To account for multiple testing, we corrected the p-values of all associations tested in the main analyses using the false discovery rate (FDR) method.
- We tested the associations between probable COVID-19 infection and the outcomes using two alternative definitions of probable COVID-19 symptoms (see Manuscript, ‘Measures’).
- We evaluated the associations of probable infection with social interactions considering only the amount of real-time contact that participants had with their family and friends.
- The regression models of the main imputed data analysis were tested again in a subsample of participants with complete data on all variables.
- We further adjusted the associations of probable COVID-19 infection with the outcomes for the presence of a mental health condition (either at the first COVID-19 assessment or at wave 9) and for the development of new physical health conditions at the first COVID-19 assessment, including cardiovascular conditions (e.g. hypertension, stroke), diabetes, respiratory illnesses (e.g. chronic lung disease, asthma), arthritis, cancer, and diseases of the visual, digestive, and nervous systems. In addition, we examined the interactions between these two variables and probable COVID-19 infection on all outcomes.
- Lastly, we tested the associations of pre-pandemic levels of depression, anxiety, poor QoL, and loneliness (2018-19) with probable COVID-19 infection (June-July 2020) in order to clarify whether the nature of their relationship might be bidirectional.

**Inverse probability of treatment weighting (IPTW)**

This technique provides unbiased estimates of the average treatment effect of an exposure on the outcome independent of measured baseline confounding factors, and it enabled us to understand how the results compare across different strategies to account for confounding in observational studies(14). The propensity scores were estimated with logistic regression models, including all covariates, the pre-pandemic outcome scores, and the longitudinal survey weights as predictors of the probability of COVID-19 infection. The balance of the covariates across the exposure groups in the unweighted and weighted datasets was assessed by computing the standardized mean differences (SMDs) for each covariate. Although no threshold is universally accepted, covariates with SMDs lower than 0.1 are typically considered well balanced(15).

**Software**

Data management and linear/logistic regression analyses were conducted in Stata 16. Graphical(16), MICE(17), and IPTW(11) analyses were performed in R version 4.0.2.
**Results**

**Descriptive statistics**

The distribution of the covariates and outcomes in participants with and without probable COVID-19 infection at the first COVID-19 assessment is shown in Table 1. Participants with probable COVID-19 infection were younger on average, were more likely to be employed than to be retired, and had lower wealth compared with those without probable infection. People with probable COVID-19 infection were also more likely to experience elevated symptoms of depression and anxiety; they reported poorer quality of life and loneliness; and they were more worried about their future financial situation and more likely to experience greater financial difficulties than before COVID-19. The levels of infrequent contact with family and friends were slightly lower in people with probable COVID-19 infection than in those without, but these differences were not statistically significant (Table 1). Similar differences in mental health and financial hardship between participants with and without COVID-19 infection were also observed at the second COVID-19 assessment (SI – sTable2).

**Sensitivity analyses**

(i) **IPTW analyses**

A comparison of the associations between COVID-19 infection and mental health, financial hardship, and social connections found in the IPTW regression analyses versus standard logistic/linear regression analyses is presented in sFigure2 (SI). The full statistical results of the IPTW regression models are reported in sTable13 (SI). The balance of the covariates across the exposure groups in the propensity score weighted and unweighted datasets is shown in sFigure1 (SI). SMDs for all covariates were lower than 0.1 in the weighted sample. The associations found in the IPTW regression analyses mirrored those of the main linear/logistic regression analyses. Compared with those without probable COVID-19 infection, people with probable infection were at increased risk of depression (OR\_assess1 1.36 [95%CI: 1.08;1.71] p=0.010; OR\_assess2 1.47 [95%CI: 1.19;1.81] p<0.001), anxiety (OR\_assess1 1.59 [95%CI: 1.17;2.17] p=0.003; OR\_assess2 1.69 [95%CI: 1.27;2.24] p<0.001), poor QoL (b\_assess1 0.93 [95%CI: 0.24;1.62] p=0.008; b\_assess2 1.33 [95%CI: 0.64;2.02] p<0.001), and loneliness (b\_assess1 0.38 [95%CI: 0.15;0.61] p=0.001; b\_assess2 0.24 [95%CI: 0.01;0.48] p=0.039) at both COVID-19 assessments, and they also were more likely to experience greater financial difficulties in June-July 2020 than before the start of the pandemic (OR\_assess1 1.40 [95%CI: 1.11;1.77] p=0.005). In contrast, no significant differences in the levels of financial worries and social contact with family and friends were observed between people with and without probable infection (Figure 2; SI – sTable13).
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### Supplementary tables and figures

**Table 1.** Comparison of the characteristics of ELSA participants included in the analytical sample versus those not included at wave 9.

|                          | Non-included (N=3590) | Included (N=5146) | p-value |
|--------------------------|------------------------|-------------------|---------|
| **Age**                  |                        |                   |         |
| Mean (SD)                | 67.566 (11.275)        | 68.207 (9.045)    | 0.004   |
| Range                    | 50.000 - 90.000        | 50.000 - 90.000   |         |
| **Sex**                  |                        |                   |         |
| Male                     | 1639 (45.7%)           | 2215 (43.0%)      | 0.016   |
| Female                   | 1951 (54.3%)           | 2931 (57.0%)      |         |
| **Ethnicity**            |                        |                   | < 0.001 |
| White                    | 3343 (93.3%)           | 4955 (96.3%)      |         |
| Non-White                | 241 (6.7%)             | 189 (3.7%)        |         |
| **Work status**          |                        |                   | < 0.001 |
| Retired                  | 1845 (51.4%)           | 3305 (64.2%)      |         |
| Employed                 | 1323 (36.9%)           | 1437 (27.9%)      |         |
| Other not working        | 422 (11.8%)            | 404 (7.9%)        |         |
| **Wealth**               |                        |                   | 0.014   |
| Mean (SD)                | 189634.083 (525585.754)| 217683.739 (512556.189) |         |
| Range                    | -55000.000 - 12416100.000 | -100900.000 - 12416100.000 |         |
| **Self-rated health**    |                        |                   | < 0.001 |
| Excellent                | 404 (12.9%)            | 629 (12.4%)       |         |
| Very good                | 718 (23.0%)            | 1653 (32.6%)      |         |
| Good                     | 1006 (32.2%)           | 1699 (33.6%)      |         |
| Fair                     | 664 (21.3%)            | 794 (15.7%)       |         |
| Poor                     | 332 (10.6%)            | 289 (5.7%)        |         |

*Note.* P-values obtained from t-tests (continuous variables) or chi-square tests (categorical variables); SD = standard deviation.
Table 2. Mental health, financial hardship, and social connections in people with and without probable COVID-19 infection at the second COVID-19 assessment (Nov-Dec 2020).

|                          | Probable infection: No (N=4,645) | Probable infection: Yes (N=501) | P-value |
|--------------------------|-----------------------------------|---------------------------------|---------|
| **Elevated depressive symptoms (CESD-8 ≥ 4)** |                                   |                                 |         |
| No                       | 73.00%                            | 58.20%                          | <0.001  |
| Yes                      | 27.00%                            | 41.80%                          |         |
| **Anxiety (Gad-7 ≥ 10)** |                                   |                                 |         |
| No                       | 89.80%                            | 82.80%                          | 0.001   |
| Yes                      | 10.20%                            | 17.20%                          |         |
| **Poor Quality of Life (CASP-12)** |                                   |                                 |         |
| Mean (SD)                | 22.785 (6.572)                    | 25.631 (7.018)                  | <0.001  |
| Range                    | 9.000 - 48.000                    | 12.000 - 45.000                 |         |
| **Loneliness**           |                                   |                                 |         |
| Mean (SD)                | 5.694 (2.126)                     | 6.253 (2.510)                   | 0.001   |
| Range                    | 3.000 - 12.000                    | 4.000 - 12.000                  |         |
| **Worried about future financial situation** |                                   |                                 |         |
| No                       | 73.90%                            | 60.10%                          | <0.001  |
| Yes                      | 26.10%                            | 39.90%                          |         |
| **Current financial situation worse than pre-covid** |                                   |                                 |         |
| No                       | 81.60%                            | 74.20%                          | 0.009   |
| Yes                      | 18.40%                            | 25.80%                          |         |
| **Infrequent contact with family** |                                   |                                 |         |
| No                       | 89.70%                            | 89.70%                          | 0.977   |
| Yes                      | 10.30%                            | 10.30%                          |         |
| **Infrequent contact with friends** |                                   |                                 |         |
| No                       | 84.90%                            | 82.70%                          | 0.376   |
| Yes                      | 15.10%                            | 17.30%                          |         |
| **Infrequent contact with family and friends (total score)** |                                   |                                 |         |
| Mean (SD)                | 24.589 (5.041)                    | 24.429 (5.116)                  | 0.641   |
| Range                    | 8.000 - 32.000                    | 8.000 - 32.000                  |         |

*Note.* Results based on 20 imputed datasets; percentages and means are estimated using sampling weights; pooled p-value estimates from logistic regression models across the imputed datasets, weighted using survey weights. SD = standard deviation.
| Outcome | Exposure | OR/b | p-value | CI (lower) | CI (upper) | FDR corrected p-value |
|---------|----------|------|---------|------------|------------|-----------------------|
| **Mental Health** | | | | | | |
| Depression, June-July 2020 (OR) | COVID-19 infection (vs no infection) | 1.617 | 0.005 | 1.158 | 2.258 | 0.025 |
| Depression, Nov-Dec 2020 (OR) | 1.564 | 0.003 | 1.169 | 2.092 | 0.015 |
| Anxiety, June-July 2020 (OR) | 1.586 | 0.049 | 1.003 | 2.508 | 0.184 |
| Anxiety, Nov-Dec 2020 (OR) | 1.553 | 0.041 | 1.018 | 2.370 | 0.160 |
| Poor QoL, June-July 2020 (b) | 1.340 | 0.000 | 0.661 | 2.018 | 0.001 |
| Poor QoL, Nov-Dec 2020 (b) | 1.382 | 0.000 | 0.737 | 2.027 | 0.000 |
| Loneliness, June-July 2020 (b) | 0.491 | 0.000 | 0.247 | 0.735 | 0.001 |
| Loneliness, Nov-Dec 2020 (b) | 0.310 | 0.024 | 0.042 | 0.577 | 0.100 |
| **Financial Hardship** | | | | | | |
| Worried, June-July 2020 (OR) | 1.196 | 0.318 | 0.842 | 1.699 | 0.619 |
| Worried, Nov-Dec 2020 (OR) | 1.112 | 0.571 | 0.770 | 1.606 | 0.829 |
| Worse off, June-July 2020 (OR) | 1.502 | 0.011 | 1.099 | 2.053 | 0.053 |
| Worse off, Nov-Dec 2020 (OR) | 1.156 | 0.407 | 0.821 | 1.629 | 0.698 |
| **Social Connections** | | | | | | |
| Infrequent contact with family, June-July 2020 (OR) | 0.698 | 0.184 | 0.410 | 1.187 | 0.432 |
| Infrequent contact with family, Nov-Dec 2020 (OR) | 0.998 | 0.991 | 0.649 | 1.533 | 0.994 |
| Infrequent contact with friends, June-July 2020 (OR) | 0.793 | 0.259 | 0.530 | 1.187 | 0.544 |
| Infrequent contact with friends, Nov-Dec 2020 (OR) | 1.252 | 0.248 | 0.855 | 1.835 | 0.538 |
| Infrequent contact with family/friends (total score), June-July 2020 (b) | -0.178 | 0.483 | -0.676 | 0.320 | 0.772 |
| Infrequent contact with family/friends (total score), Nov-Dec 2020 (b) | 0.039 | 0.871 | -0.433 | 0.511 | 0.978 |

*Note.* Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; Models adjusted for sex, age groups, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; QoL = quality of life; FDR = false discovery rate.
Table 4. Interaction effects between probable COVID-19 infection and sociodemographic factors on depression.

| Outcome                  | Exposure                              | OR  | p-value | CI (lower) | CI (upper) | FDR corrected p-value |
|--------------------------|---------------------------------------|-----|---------|------------|------------|-----------------------|
| **Depression, June-July 2020** | COVID-19 infection                     | 0.983 | 0.971  | 0.387      | 2.498      | 0.981                 |
|                          | Sex: Female (vs Male)                 | 1.645 | 0.000  | 1.316      | 2.056      | 0.000                 |
|                          | COVID-19 infection*Female             | 1.162 | 0.668  | 0.584      | 2.314      | 0.884                 |
|                          | Age group: 60-74 (vs 52-59)           | 0.753 | 0.082  | 0.547      | 1.037      | 0.264                 |
|                          | Age group: 75+                        | 0.525 | 0.001  | 0.359      | 0.769      | 0.006                 |
|                          | COVID-19 infection*60-74              | 0.827 | 0.741  | 0.268      | 2.550      | 0.937                 |
|                          | COVID-19 infection*75+                | 0.922 | 0.901  | 0.258      | 3.297      | 0.978                 |
|                          | Work: Retired (vs employed)           | 1.221 | 0.173  | 0.916      | 1.626      | 0.418                 |
|                          | Work: Other not working               | 2.677 | 0.000  | 1.735      | 4.131      | 0.000                 |
|                          | COVID-19 infection*Retired            | 1.687 | 0.353  | 0.559      | 5.085      | 0.633                 |
|                          | COVID-19 infection*Other not working  | 1.527 | 0.546  | 0.386      | 6.049      | 0.810                 |
|                          | Wealth: Medium (vs High)              | 1.157 | 0.285  | 0.885      | 1.513      | 0.586                 |
|                          | Wealth: Low                           | 1.150 | 0.318  | 0.874      | 1.513      | 0.619                 |
|                          | COVID-19 infection*Medium wealth      | 1.063 | 0.877  | 0.492      | 2.293      | 0.978                 |
|                          | COVID-19 infection*Low wealth         | 1.339 | 0.458  | 0.619      | 2.899      | 0.751                 |
|                          | Living alone                          | 1.518 | 0.000  | 1.212      | 1.901      | 0.002                 |
|                          | COVID-19 infection*Living alone       | 1.273 | 0.529  | 0.600      | 2.701      | 0.807                 |
| **Depression, Nov-Dec 2020** | COVID-19 infection                     | 1.436 | 0.382  | 0.638      | 3.230      | 0.678                 |
|                          | Sex: Female (vs Male)                 | 1.466 | 0.000  | 1.210      | 1.776      | 0.001                 |
|                          | COVID-19 infection*Female             | 1.120 | 0.704  | 0.623      | 2.014      | 0.906                 |
|                          | Age group: 60-74 (vs 52-59)           | 0.800 | 0.126  | 0.601      | 1.065      | 0.340                 |
|                          | Age group: 75+                        | 0.533 | 0.000  | 0.383      | 0.742      | 0.002                 |
|                          | COVID-19 infection*60-74              | 0.521 | 0.170  | 0.206      | 1.322      | 0.416                 |
|                          | COVID-19 infection*75+                | 0.703 | 0.535  | 0.231      | 2.142      | 0.807                 |
|                          | Work: Retired (vs employed)           | 1.095 | 0.496  | 0.843      | 1.423      | 0.774                 |
|                          | Work: Other not working               | 2.285 | 0.000  | 1.535      | 3.401      | 0.001                 |
|                          | COVID-19 infection*Retired            | 1.514 | 0.379  | 0.600      | 3.818      | 0.678                 |
|                          | COVID-19 infection*Other not working  | 1.384 | 0.619  | 0.384      | 4.989      | 0.859                 |
|                          | Wealth: Medium (vs High)              | 1.105 | 0.401  | 0.875      | 1.396      | 0.696                 |
|                          | Wealth: Low                           | 1.318 | 0.252  | 1.035      | 1.678      | 0.104                 |
|                          | COVID-19 infection*Medium wealth      | 1.294 | 0.481  | 0.631      | 2.653      | 0.772                 |
|                          | COVID-19 infection*Low wealth         | 1.174 | 0.674  | 0.554      | 2.488      | 0.884                 |
|                          | Living alone                          | 1.542 | 0.000  | 1.250      | 1.904      | 0.001                 |
|                          | COVID-19 infection*Living alone       | 0.972 | 0.937  | 0.482      | 1.961      | 0.980                 |

Note: Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; models adjusted for sex, age, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness and including interaction effects between COVID-19 infection and sociodemographic factors; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; FDR = false discovery rate.
| Table 5. Interaction effects between probable COVID-19 infection and sociodemographic factors on anxiety. |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| **Outcome**                     | **Exposure**    | **OR**          | **p-value**     | **CI (lower)**  | **CI (upper)**  |
| **Anxiety, June-July 2020**    | COVID-19 infection | 0.473           | 0.301           | 0.115           | 1.952           |
|  | Sex: Female (vs Male)       | 1.348           | 0.082           | 0.962           | 1.888           |
|  | COVID-19 infection*Female  | 1.196           | 0.721           | 0.448           | 3.196           |
|  | Age group: 60-74 (vs 52-59) | 0.740           | 0.209           | 0.463           | 1.184           |
|  | Age group: 75+              | 0.372           | **0.000**       | 0.214           | 0.648           |
|  | COVID-19 infection*60-74    | 2.401           | 0.254           | 0.533           | 10.820          |
|  | COVID-19 infection*75+      | 1.802           | 0.494           | 0.333           | 9.737           |
|  | Work: Other not working    | 1.569           | **0.050**       | 1.000           | 2.463           |
|  | COVID-19 infection*Retired  | 3.332           | **0.000**       | 1.911           | 5.810           |
|  | COVID-19 infection*Other not working | 0.878 | 0.876 | 0.172 | 4.494 |
|  | Wealth: Medium (vs High)    | 1.356           | 0.160           | 0.886           | 2.076           |
|  | Wealth: Low                | 1.919           | **0.002**       | 1.269           | 2.902           |
|  | COVID-19 infection*Medium wealth | 1.580 | 0.478 | 0.447 | 5.588 |
|  | COVID-19 infection*Low wealth | 1.876 | 0.296 | 0.576 | 6.112 |
|  | Living alone               | 1.198           | 0.287           | 0.859           | 1.672           |
|  | COVID-19 infection*Living alone | 1.646 | 0.384 | 0.536 | 5.060 |
| **Anxiety, Nov-Dec 2020**      | COVID-19 infection | 0.321           | 0.123           | 0.076           | 1.359           |
|  | Sex: Female (vs Male)       | 1.635           | **0.003**       | 1.184           | 2.258           |
|  | COVID-19 infection*Female  | 2.046           | 0.103           | 0.866           | 4.833           |
|  | Age group: 60-74 (vs 52-59) | 0.533           | **0.004**       | 0.348           | 0.814           |
|  | Age group: 75+              | 0.237           | **0.000**       | 0.141           | 0.400           |
|  | COVID-19 infection*60-74    | 2.497           | 0.176           | 0.663           | 9.402           |
|  | COVID-19 infection*75+      | 3.123           | 0.156           | 0.647           | 15.077          |
|  | Work: Retired (vs employed) | 2.293           | **0.000**       | 1.535           | 3.424           |
|  | Work: Other not working    | 4.019           | **0.000**       | 2.393           | 6.751           |
|  | COVID-19 infection*Retired  | 1.226           | 0.750           | 0.350           | 4.299           |
|  | COVID-19 infection*Other not working | 1.555 | 0.541 | 0.377 | 6.412 |
|  | Wealth: Medium (vs High)    | 1.293           | 0.189           | 0.881           | 1.898           |
|  | Wealth: Low                | 1.425           | 0.062           | 0.982           | 2.069           |
|  | COVID-19 infection*Medium wealth | 0.921 | 0.889 | 0.290 | 2.923 |
|  | COVID-19 infection*Low wealth | 1.471 | 0.519 | 0.456 | 4.750 |
|  | Living alone               | 0.934           | 0.698           | 0.661           | 1.319           |
|  | COVID-19 infection*Living alone | 1.642 | 0.303 | 0.639 | 4.214 |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; models adjusted for sex, age, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness and including interaction effects between COVID-19 infection and sociodemographic factors; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; FDR = false discovery rate.
### Table 6. Interaction effects between probable COVID-19 infection and sociodemographic factors on poor QoL.

| Outcome          | Exposure                          | b   | p-value | CI (lower) | CI (upper) | FDR corrected p-value |
|------------------|-----------------------------------|-----|---------|------------|------------|-----------------------|
| **Poor QoL, June-July 2020** | COVID-19 infection               | 0.887 | 0.201   | -0.472     | 2.246      | 0.451                 |
|                  | Sex: Female (vs Male)             | 0.718 | **0.000** | 0.363     | 1.072      | **0.001**             |
|                  | COVID-19 infection*Female         | -1.284 | **0.035** | -2.477     | -0.091     | 0.139                 |
|                  | Age group: 60-74 (vs 52-59)       | -0.513 | 0.054   | -1.035     | 0.010      | 0.195                 |
|                  | Age group: 75+                    | -0.312 | 0.363   | -0.984     | 0.360      | 0.663                 |
|                  | COVID-19 infection*60-74          | -1.280 | 0.145   | -3.002     | 0.443      | 0.375                 |
|                  | COVID-19 infection*75+            | -0.926 | 0.422   | -3.186     | 1.335      | 0.707                 |
|                  | Work: Retired (vs employed)       | 0.386 | 0.112   | -0.090     | 0.863      | 0.323                 |
|                  | Work: Other not working           | 1.985 | **0.000** | 1.032     | 2.938      | **0.001**             |
|                  | COVID-19 infection*Retired        | 1.091 | 0.211   | -0.619     | 2.801      | 0.464                 |
|                  | COVID-19 infection*Other not working | 3.705 | **0.024** | 0.495     | 6.916      | 0.100                 |
|                  | Wealth: Medium (vs High)          | -0.123 | 0.536   | -0.514     | 0.268      | 0.807                 |
|                  | Wealth: Low                       | 0.051 | 0.815   | -0.373     | 0.475      | 0.967                 |
|                  | COVID-19 infection*Medium wealth  | 0.771 | 0.193   | -0.389     | 1.932      | 0.444                 |
|                  | COVID-19 infection*Low wealth     | 1.499 | **0.028** | 0.159     | 2.840      | 0.116                 |
|                  | Living alone                      | 0.165 | 0.410   | -0.227     | 0.557      | 0.698                 |
|                  | COVID-19 infection*Living alone   | 0.078 | 0.919   | -1.424     | 1.580      | 0.979                 |
| **Poor QoL, Nov-Dec 2020** | COVID-19 infection               | 1.022 | 0.196   | -0.527     | 2.572      | 0.449                 |
|                  | Sex: Female (vs Male)             | 0.740 | **0.000** | 0.379     | 1.102      | **0.001**             |
|                  | COVID-19 infection*Female         | 0.178 | 0.781   | -1.076     | 1.432      | 0.958                 |
|                  | Age group: 60-74 (vs 52-59)       | -0.857 | **0.002** | -1.393     | -0.321     | **0.011**             |
|                  | Age group: 75+                    | -0.587 | 0.121   | -1.329     | 0.155      | 0.339                 |
|                  | COVID-19 infection*60-74          | -0.958 | 0.324   | -2.864     | 0.948      | 0.619                 |
|                  | COVID-19 infection*75+            | -0.113 | 0.923   | -2.403     | 2.177      | 0.980                 |
|                  | Work: Retired (vs employed)       | 0.691 | **0.004** | 0.215     | 1.168      | **0.024**             |
|                  | Work: Other not working           | 1.676 | **0.001** | 0.683     | 2.669      | **0.006**             |
|                  | COVID-19 infection*Retired        | -0.170 | 0.850   | -1.925     | 1.585      | 0.978                 |
|                  | COVID-19 infection*Other not working | 0.614 | 0.667   | -2.185     | 3.412      | 0.884                 |
|                  | Wealth: Medium (vs High)          | 0.089 | 0.660   | -0.308     | 0.486      | 0.883                 |
|                  | Wealth: Low                       | 0.127 | 0.564   | -0.305     | 0.560      | 0.824                 |
|                  | COVID-19 infection*Medium wealth  | 1.085 | 0.131   | -0.325     | 2.495      | 0.348                 |
|                  | COVID-19 infection*Low wealth     | 0.920 | 0.253   | -0.659     | 2.499      | 0.543                 |
|                  | Living alone                      | 0.163 | 0.441   | -0.251     | 0.577      | 0.726                 |
|                  | COVID-19 infection*Living alone   | -0.256 | 0.732   | -1.716     | 1.205      | 0.930                 |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; models adjusted for sex, age, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness and including interaction effects between COVID-19 infection and sociodemographic factors; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; CI = 95% confidence interval; QoL = quality of life; FDR = false discovery rate.
### Table 7. Interaction effects between probable COVID-19 infection and sociodemographic factors on loneliness.

| Outcome                  | Exposure                                      | b     | p-value   | CI (lower) | CI (upper) | FDR corrected p-value |
|--------------------------|-----------------------------------------------|-------|-----------|------------|------------|-----------------------|
| **Loneliness, June-July 2020** |                                |       |           |            |            |                       |
|                          | COVID-19 infection                          | 0.261 | 0.326     | -0.259     | 0.781      | 0.619                 |
|                          | Sex: Female (vs Male)                        | 0.292 | **0.000** | 0.168      | 0.416      | **0.000**             |
|                          | COVID-19 infection*Female                    | 0.214 | 0.365     | -0.249     | 0.677      | 0.663                 |
|                          | Age group: 60-74 (vs 52-59)                  | -0.234 | **0.011** | -0.416     | -0.053     | **0.055**             |
|                          | Age group: 75+                              | -0.360 | **0.001** | -0.580     | -0.141     | **0.008**             |
|                          | COVID-19 infection*60-74                     | -0.461 | 0.180     | -1.136     | 0.214      | 0.428                 |
|                          | COVID-19 infection*75+                       | -0.346 | 0.416     | -1.179     | 0.488      | 0.700                 |
|                          | Work: Retired (vs employed)                  | 0.115 | 0.164     | -0.047     | 0.276      | 0.411                 |
|                          | Work: Other not working                      | 0.305 | 0.066     | -0.020     | 0.630      | 0.228                 |
|                          | COVID-19 infection*Retired                   | 0.422 | 0.167     | -0.177     | 1.020      | 0.413                 |
|                          | COVID-19 infection*Other not working         | 1.369 | **0.015** | 0.267      | 2.471      | 0.068                 |
|                          | Wealth: Medium (vs High)                     | -0.085 | 0.201     | -0.216     | 0.045      | 0.451                 |
|                          | Wealth: Low                                 | 0.065 | 0.372     | -0.078     | 0.208      | 0.670                 |
|                          | COVID-19 infection*Medium wealth             | 0.140 | 0.574     | -0.348     | 0.629      | 0.829                 |
|                          | COVID-19 infection*Low wealth                | -0.051 | 0.846     | -0.567     | 0.465      | 0.978                 |
|                          | Living alone                                | 0.619 | **0.000** | 0.461      | 0.777      | **0.000**             |
|                          | COVID-19 infection*Living alone              | 0.098 | 0.752     | -0.510     | 0.707      | 0.938                 |
| **Loneliness, Nov-Dec 2020** |                                |       |           |            |            |                       |
|                          | COVID-19 infection                          | -0.148 | 0.584     | -0.677     | 0.382      | 0.834                 |
|                          | Sex: Female (vs Male)                        | 0.234 | **0.000** | 0.106      | 0.363      | **0.003**             |
|                          | COVID-19 infection*Female                    | 0.499 | 0.059     | -0.019     | 1.018      | 0.209                 |
|                          | Age group: 60-74 (vs 52-59)                  | -0.209 | **0.031** | -0.399     | -0.019     | 0.125                 |
|                          | Age group: 75+                              | -0.340 | **0.004** | -0.573     | -0.107     | **0.024**             |
|                          | COVID-19 infection*60-74                     | -0.766 | **0.024** | -1.430     | -0.101     | 0.100                 |
|                          | COVID-19 infection*75+                       | -0.729 | 0.121     | -1.649     | 0.191      | 0.339                 |
|                          | Work: Retired (vs employed)                  | 0.147 | 0.085     | -0.020     | 0.313      | 0.269                 |
|                          | Work: Other not working                      | 0.329 | **0.049** | 0.001      | 0.657      | 0.184                 |
|                          | COVID-19 infection*Retired                   | 0.481 | 0.107     | -0.105     | 1.067      | 0.316                 |
|                          | COVID-19 infection*Other not working         | 0.757 | 0.109     | -0.168     | 1.682      | 0.316                 |
|                          | Wealth: Medium (vs High)                     | -0.078 | 0.277     | -0.219     | 0.063      | 0.573                 |
|                          | Wealth: Low                                 | -0.037 | 0.639     | -0.189     | 0.116      | 0.874                 |
|                          | COVID-19 infection*Medium wealth             | 0.411 | 0.123     | -0.111     | 0.933      | 0.339                 |
|                          | COVID-19 infection*Low wealth                | 0.114 | 0.633     | -0.355     | 0.583      | 0.870                 |
|                          | Living alone                                | 0.582 | **0.000** | 0.416      | 0.748      | **0.000**             |
|                          | COVID-19 infection*Living alone              | 0.689 | 0.082     | -0.087     | 1.464      | 0.264                 |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; models adjusted for sex, age, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness and including interaction effects between COVID-19 infection and sociodemographic factors; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; CI = 95% confidence interval; FDR = false discovery rate.
| Outcome                  | Exposure                                      | OR      | p-value | CI (lower) | CI (upper) | FDR corrected p-value |
|-------------------------|-----------------------------------------------|---------|---------|------------|------------|-----------------------|
| Financial hardship      | COVID-19 infection                            | 1.481   | 0.411   | 0.581      | 3.775      | 0.698                 |
|                         | Sex: Female (vs Male)                         | 1.489   | 0.001   | 1.189      | 1.865      | 0.004                 |
|                         | COVID-19 infection*Female                     | 0.948   | 0.887   | 0.457      | 1.967      | 0.978                 |
|                         | Age group: 60-74 (vs 52-59)                   | 0.859   | 0.305   | 0.641      | 1.149      | 0.601                 |
|                         | Age group: 75+                               | 0.470   | 0.000   | 0.309      | 0.714      | 0.003                 |
|                         | COVID-19 infection*60-74                      | 0.590   | 0.294   | 0.220      | 1.582      | 0.598                 |
|                         | COVID-19 infection*75+                        | 0.546   | 0.396   | 0.135      | 2.207      | 0.691                 |
|                         | Work: Retired (vs employed)                   | 0.344   | 0.000   | 0.261      | 0.454      | 0.000                 |
|                         | Work: Other not working                       | 0.971   | 0.895   | 0.630      | 1.498      | 0.978                 |
|                         | COVID-19 infection*Retired                    | 2.772   | 0.038   | 1.057      | 7.272      | 0.151                 |
|                         | COVID-19 infection*Other not working          | 1.436   | 0.610   | 0.357      | 5.766      | 0.849                 |
|                         | Wealth: Medium (vs High)                     | 1.448   | 0.012   | 1.084      | 1.935      | 0.058                 |
|                         | Wealth: Low                                  | 1.298   | 0.679   | 0.970      | 1.737      | 0.264                 |
|                         | COVID-19 infection*Medium wealth              | 0.435   | 0.054   | 0.187      | 1.013      | 0.195                 |
|                         | COVID-19 infection*Low wealth                 | 1.179   | 0.694   | 0.521      | 2.668      | 0.900                 |
|                         | Living alone                                 | 1.226   | 0.124   | 0.946      | 1.588      | 0.340                 |
|                         | COVID-19 infection*Living alone               | 0.621   | 0.269   | 0.267      | 1.444      | 0.560                 |
|                         | COVID-19 infection                            | 1.351   | 0.555   | 0.497      | 3.668      | 0.819                 |
| Financial hardship      | COVID-19 infection                            | 1.436   | 0.001   | 1.149      | 1.794      | 0.009                 |
|                         | Sex: Female (vs Male)                         | 1.535   | 0.259   | 0.729      | 3.233      | 0.544                 |
|                         | COVID-19 infection*Female                     | 0.770   | 0.078   | 0.576      | 1.030      | 0.263                 |
|                         | Age group: 60-74 (vs 52-59)                   | 0.389   | 0.000   | 0.266      | 0.569      | 0.000                 |
|                         | COVID-19 infection*75+                        | 0.398   | 0.075   | 0.144      | 1.096      | 0.256                 |
|                         | COVID-19 infection*Retired                    | 0.601   | 0.489   | 0.142      | 2.539      | 0.772                 |
|                         | Work: Retired (vs employed)                   | 0.446   | 0.000   | 0.338      | 0.588      | 0.000                 |
|                         | Work: Other not working                       | 1.027   | 0.903   | 0.669      | 1.576      | 0.978                 |
|                         | COVID-19 infection*Retired                    | 2.329   | 0.109   | 0.829      | 6.547      | 0.316                 |
|                         | COVID-19 infection*Other not working          | 0.848   | 0.800   | 0.237      | 3.034      | 0.967                 |
|                         | Wealth: Medium (vs High)                     | 1.579   | 0.003   | 1.173      | 2.126      | 0.015                 |
|                         | Wealth: Low                                  | 1.521   | 0.006   | 1.130      | 2.047      | 0.029                 |
|                         | COVID-19 infection*Medium wealth              | 0.512   | 0.137   | 0.211      | 1.239      | 0.361                 |
|                         | COVID-19 infection*Low wealth                 | 1.270   | 0.588   | 0.534      | 3.022      | 0.834                 |
|                         | Living alone                                 | 1.251   | 0.088   | 0.967      | 1.619      | 0.277                 |
|                         | COVID-19 infection*Living alone               | 0.490   | 0.108   | 0.206      | 1.168      | 0.316                 |

Note: Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; models adjusted for sex, age, pre-COVID-19 outcome, Nov–Dec 2020 COVID-19 infection (Nov–Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness and including interaction effects between COVID-19 infection and sociodemographic factors; June–July 2020 = COVID-19 assessment 1; Nov–Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; FDR = false discovery rate.
| Outcome | Exposure | OR     | p-value | CI (lower) | CI (upper) | FDR corrected p-value |
|---------|----------|--------|---------|------------|------------|-----------------------|
| **Financial hardship – Worse off, June-July 2020** | COVID-19 infection | 1.699  | 0.197   | 0.759      | 3.803      | 0.449                 |
|         | Sex: Female (vs Male) | 0.788  | **0.022** | 0.643      | 0.967      | 0.097                 |
|         | COVID-19 infection*Female | 0.833  | 0.575   | 0.440      | 1.576      | 0.829                 |
|         | Age group: 60-74 (vs 52-59) | 0.891  | 0.436   | 0.668      | 1.190      | 0.722                 |
|         | Age group: 75+ | 0.533  | **0.001** | 0.366      | 0.776      | **0.007**             |
|         | COVID-19 infection*60-74 | 0.811  | 0.630   | 0.345      | 1.906      | 0.870                 |
|         | COVID-19 infection*75+ | 1.185  | 0.765   | 0.389      | 3.605      | 0.947                 |
|         | Work: Retired (vs employed) | 0.477  | **0.000** | 0.366      | 0.620      | **0.000**             |
|         | Work: Other not working | 0.529  | **0.005** | 0.340      | 0.823      | **0.025**             |
|         | COVID-19 infection*Retired | 0.886  | 0.783   | 0.375      | 2.095      | 0.958                 |
|         | COVID-19 infection*Other not working | 1.296  | 0.645   | 0.430      | 3.900      | 0.874                 |
|         | Wealth: Medium (vs High) | 0.533  | **0.000** | 0.415      | 0.685      | **0.000**             |
|         | COVID-19 infection*Medium wealth | 0.914  | 0.819   | 0.422      | 1.979      | 0.968                 |
|         | COVID-19 infection*Low wealth | 1.140  | 0.743   | 0.520      | 2.498      | 0.937                 |
|         | Living alone | 1.164  | 0.239   | 0.904      | 1.500      | 0.521                 |
|         | COVID-19 infection*Living alone | 0.972  | 0.946   | 0.431      | 2.193      | 0.980                 |
| **Financial hardship – Worse off, Nov-Dec 2020** | COVID-19 infection | 1.083  | 0.850   | 0.472      | 2.485      | 0.978                 |
|         | Sex: Female (vs Male) | 0.826  | 0.081   | 0.666      | 1.024      | 0.264                 |
|         | COVID-19 infection*Female | 0.504  | 0.051   | 0.253      | 1.004      | 0.189                 |
|         | Age group: 60-74 (vs 52-59) | 0.693  | **0.014** | 0.518      | 0.928      | 0.064                 |
|         | Age group: 75+ | 0.492  | **0.000** | 0.333      | 0.727      | **0.003**             |
|         | COVID-19 infection*60-74 | 1.219  | 0.672   | 0.487      | 3.049      | 0.884                 |
|         | COVID-19 infection*75+ | 1.528  | 0.506   | 0.438      | 5.324      | 0.785                 |
|         | Work: Retired (vs employed) | 0.497  | **0.000** | 0.377      | 0.656      | **0.000**             |
|         | Work: Other not working | 0.566  | **0.009** | 0.369      | 0.868      | **0.046**             |
|         | COVID-19 infection*Retired | 1.501  | 0.389   | 0.596      | 3.778      | 0.683                 |
|         | COVID-19 infection*Other not working | 3.566  | **0.021** | 1.215      | 10.469     | 0.091                 |
|         | Wealth: Medium (vs High) | 0.580  | **0.000** | 0.447      | 0.751      | **0.000**             |
|         | Wealth: Low | 0.389  | **0.000** | 0.293      | 0.517      | **0.000**             |
|         | COVID-19 infection*Medium wealth | 0.782  | 0.546   | 0.352      | 1.737      | 0.810                 |
|         | COVID-19 infection*Low wealth | 1.297  | 0.514   | 0.594      | 2.834      | 0.791                 |
|         | Living alone | 1.027  | 0.851   | 0.781      | 1.350      | 0.978                 |
|         | COVID-19 infection*Living alone | 0.662  | 0.328   | 0.290      | 1.512      | 0.619                 |

Note. Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; models adjusted for sex, age, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness and including interaction effects between COVID-19 infection and sociodemographic factors; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; FDR = false discovery rate.
### Table 10. Interaction effects between probable COVID-19 infection and sociodemographic factors on infrequent real-time/written contact with family.

| Outcome | Exposure | OR     | p-value | CI (lower) | CI (upper) | FDR corrected p-value |
|---------|----------|--------|---------|------------|------------|-----------------------|
| **Infrequent real-time/written contact with family, June-July 2020** | COVID-19 infection | 0.275  | 0.172   | 0.043      | 1.753      | 0.418                |
| | Sex: Female (vs Male) | 0.448  | **0.000** | 0.328      | 0.611      | **0.000**            |
| | COVID-19 infection*Female | 2.245  | 0.185   | 0.680      | 7.416      | 0.432                |
| | Age group: 60-74 (vs 52-59) | 1.042  | 0.873   | 0.632      | 1.717      | 0.978                |
| | COVID-19 infection*60-74 | 4.799  | 0.118   | 0.672      | 34.289     | 0.337                |
| | Work: Retired (vs employed) | 2.343  | 0.434   | 0.278      | 19.759     | 0.722                |
| | Work: Other not working | 0.972  | 0.904   | 0.609      | 1.550      | 0.978                |
| | Age group: 75+ | 1.193  | 0.589   | 0.629      | 2.261      | 0.834                |
| | COVID-19 infection*75+ | 1.097  | 0.904   | 0.244      | 4.926      | 0.978                |
| | COVID-19 infection*Living alone | 0.837  | 0.484   | 0.580      | 1.295      | 0.772                |
| | Work: Retired (vs employed) | 0.972  | 0.904   | 0.609      | 1.550      | 0.978                |
| | Work: Other not working | 0.866  | 0.484   | 0.580      | 1.295      | 0.772                |
| | COVID-19 infection*Retired | 1.148  | 0.841   | 0.671      | 1.383      | 0.978                |
| | COVID-19 infection*Other not working | 0.772  | 0.662   | 0.241      | 2.467      | 0.883                |
| | Wealth: Medium (vs High) | 1.189  | 0.333   | 0.837      | 1.690      | 0.622                |
| | COVID-19 infection*Medium wealth | 1.403  | 0.589   | 0.411      | 4.786      | 0.834                |
| | COVID-19 infection*Living alone | 0.780  | 0.646   | 0.271      | 2.249      | 0.874                |
| | COVID-19 infection*Other not working | 0.966  | 0.841   | 0.671      | 1.383      | 0.978                |
| | Wealth: Low | 0.886  | 0.484   | 0.580      | 1.295      | 0.772                |
| | COVID-19 infection*Low wealth | 1.077  | 0.908   | 0.304      | 3.812      | 0.978                |
| | COVID-19 infection*60-74 | 1.177  | 0.832   | 0.261      | 5.311      | 0.977                |
| | Work: Other not working | 1.044  | 0.824   | 0.715      | 1.523      | 0.972                |
| | COVID-19 infection*Living alone | 1.176  | 0.490   | 0.743      | 1.861      | 0.772                |
| | COVID-19 infection*Other not working | 1.000  | 0.999   | 0.671      | 1.490      | 0.999                |
| | COVID-19 infection*75+ | 1.042  | 0.211   | 0.821      | 2.447      | 0.464                |
| | COVID-19 infection*75+ | 1.177  | 0.832   | 0.261      | 5.311      | 0.977                |
| | COVID-19 infection*75+ | 1.445  | 0.560   | 0.413      | 5.129      | 0.822                |
| | COVID-19 infection*75+ | 0.837  | 0.841   | 0.145      | 4.811      | 0.978                |
| | COVID-19 infection*75+ | 0.770  | 0.092   | 0.568      | 1.044      | 0.285                |
| | COVID-19 infection*75+ | 1.039  | 0.813   | 0.758      | 1.424      | 0.967                |
| | COVID-19 infection*Low wealth | 1.035  | 0.947   | 0.367      | 2.921      | 0.980                |
| | COVID-19 infection*Low wealth | 0.940  | 0.909   | 0.358      | 2.469      | 0.978                |
| | COVID-19 infection*Living alone | 1.173  | 0.305   | 0.865      | 1.592      | 0.601                |
| | COVID-19 infection*Living alone | 1.022  | 0.963   | 0.402      | 2.600      | 0.980                |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; models adjusted for sex, age, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness and including interaction effects between COVID-19 infection and sociodemographic factors; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; FDR = false discovery rate.
| Outcome | Exposure | OR  | p-value | CI (lower) | CI (upper) | FDR corrected p-value |
|---------|----------|-----|---------|------------|------------|-----------------------|
| Infrequent real-time/written contact with friends, June-July 2020 | COVID-19 infection | 0.395 | 0.126 | 0.120 | 1.299 | 0.340 |
| | Sex: Female (vs Male) | 0.428 | **0.000** | 0.332 | 0.553 | **0.000** |
| | COVID-19 infection*Female | 2.257 | **0.047** | 1.101 | 5.039 | 0.181 |
| | Age group: 60-74 (vs 52-59) | 0.990 | 0.958 | 0.680 | 1.440 | 0.980 |
| | Age group: 75+ | 1.343 | 0.164 | 0.887 | 2.035 | 0.411 |
| | COVID-19 infection*60-74 | 1.272 | 0.749 | 0.292 | 5.543 | 0.938 |
| | COVID-19 infection*75+ | 1.441 | 0.676 | 0.259 | 8.001 | 0.884 |
| | Work: Retired (vs employed) | 0.866 | 0.383 | 0.626 | 1.197 | 0.678 |
| | Work: Other not working | 0.922 | 0.778 | 0.526 | 1.619 | 0.958 |
| | COVID-19 infection*Retired | 1.703 | 0.487 | 0.379 | 5.543 | 0.938 |
| | COVID-19 infection*Other not working | 0.790 | 0.803 | 0.124 | 5.035 | 0.967 |
| | Wealth: Medium (vs High) | 0.923 | 0.605 | 0.683 | 1.249 | 0.849 |
| | Wealth: Low | 0.975 | 0.878 | 0.706 | 1.346 | 0.978 |
| | COVID-19 infection*Medium wealth | 1.126 | 0.809 | 0.430 | 2.953 | 0.967 |
| | COVID-19 infection*Low wealth | 0.783 | 0.646 | 0.276 | 2.222 | 0.874 |
| | Living alone | 0.495 | **0.000** | 0.366 | 0.669 | **0.000** |
| | COVID-19 infection*Living alone | 0.971 | 0.955 | 0.340 | 2.770 | 0.980 |
| Infrequent real-time/written contact with friends, Nov-Dec 2020 | COVID-19 infection | 1.438 | 0.461 | 0.548 | 3.777 | 0.752 |
| | Sex: Female (vs Male) | 0.423 | **0.000** | 0.337 | 0.531 | **0.000** |
| | COVID-19 infection*Female | 1.173 | 0.682 | 0.546 | 2.521 | 0.889 |
| | Age group: 60-74 (vs 52-59) | 1.018 | 0.914 | 0.731 | 1.420 | 0.979 |
| | Age group: 75+ | 1.428 | 0.078 | 0.961 | 2.124 | 0.263 |
| | COVID-19 infection*60-74 | 0.620 | 0.406 | 0.201 | 1.913 | 0.698 |
| | COVID-19 infection*75+ | 1.100 | 0.890 | 0.284 | 4.260 | 0.978 |
| | Work: Retired (vs employed) | 0.909 | 0.537 | 0.672 | 1.230 | 0.807 |
| | Work: Other not working | 1.465 | 0.107 | 0.921 | 2.329 | 0.316 |
| | COVID-19 infection*Retired | 0.966 | 0.954 | 0.292 | 3.198 | 0.980 |
| | COVID-19 infection*Other not working | 1.047 | 0.945 | 0.280 | 3.915 | 0.980 |
| | Wealth: Medium (vs High) | 1.134 | 0.354 | 0.869 | 1.481 | 0.653 |
| | Wealth: Low | 1.147 | 0.333 | 0.869 | 1.512 | 0.622 |
| | COVID-19 infection*Medium wealth | 0.858 | 0.727 | 0.362 | 2.031 | 0.928 |
| | COVID-19 infection*Low wealth | 0.952 | 0.916 | 0.383 | 2.366 | 0.979 |
| | Living alone | 0.564 | **0.000** | 0.424 | 0.750 | **0.001** |
| | COVID-19 infection*Living alone | 1.134 | 0.787 | 0.455 | 2.826 | 0.960 |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; models adjusted for sex, age, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness and including interaction effects between COVID-19 infection and sociodemographic factors; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; FDR = false discovery rate.
### Table 12. Interaction effects between probable COVID-19 infection and sociodemographic factors on infrequent real-time/written contact with family/friends (total score).

| Outcome | Exposure | b      | p-value | CI (lower) | CI (upper) | FDR corrected p-value |
|---------|----------|--------|---------|------------|------------|-----------------------|
| Infrequent real-time/written contact with family/friends (total score), June-July 2020 | COVID-19 infection | 0.395  | 0.600   | -1.081     | 1.871      | 0.846                 |
|         | Sex: Female (vs Male) | -1.842 | 0.000   | -2.137     | -1.547     | 0.000                 |
|         | COVID-19 infection*Female | -0.266 | 0.608   | -1.281     | 0.749      | 0.849                 |
|         | Age group: 60-74 (vs 52-59) | 0.031  | 0.901   | -0.462     | 0.524      | 0.978                 |
|         | Age group: 75+ | 1.508   | 0.000   | 0.931      | 2.086      | 0.000                 |
|         | COVID-19 infection*60-74 | 0.028  | 0.972   | -1.527     | 1.583      | 0.981                 |
|         | COVID-19 infection*75+ | -0.437 | 0.661   | -2.392     | 1.518      | 0.883                 |
|         | Work: Retired (vs employed) | 0.296  | 0.166   | -0.123     | 0.715      | 0.412                 |
|         | Work: Other not working | 0.579  | 0.096   | -0.104     | 1.261      | 0.297                 |
|         | COVID-19 infection*Retired | 0.611  | 0.413   | -0.853     | 2.075      | 0.699                 |
|         | COVID-19 infection*Other not working | 0.161  | 0.877   | -1.880     | 2.202      | 0.978                 |
|         | Wealth: Medium (vs High) | 0.466  | 0.010   | 0.114      | 0.819      | 0.047                 |
|         | Wealth: Low | 0.462   | 0.014   | 0.093      | 0.832      | 0.066                 |
|         | COVID-19 infection*Medium wealth | -0.974 | 0.131   | -2.239     | 0.291      | 0.348                 |
|         | COVID-19 infection*Low wealth | -0.665 | 0.323   | -1.986     | 0.655      | 0.619                 |
|         | Living alone | -0.872  | 0.000   | -1.214     | -0.530     | 0.000                 |
|         | COVID-19 infection*Living alone | -0.559 | 0.364   | -1.768     | 0.650      | 0.663                 |

| Infrequent real-time/written contact with family/friends (total score), Nov-Dec 2020 | COVID-19 infection | 0.167  | 0.813   | -1.223     | 1.558      | 0.967                 |
|         | Sex: Female (vs Male) | -1.880  | 0.000   | -2.159     | -1.601     | 0.000                 |
|         | COVID-19 infection*Female | -0.023 | 0.962   | -0.985     | 0.938      | 0.980                 |
|         | Age group: 60-74 (vs 52-59) | -0.006 | 0.980   | -0.473     | 0.461      | 0.986                 |
|         | Age group: 75+ | 1.162  | 0.000   | 0.615      | 1.709      | 0.000                 |
|         | COVID-19 infection*60-74 | 0.033  | 0.964   | -1.439     | 1.506      | 0.980                 |
|         | COVID-19 infection*75+ | -0.071 | 0.940   | -1.922     | 1.779      | 0.980                 |
|         | Work: Retired (vs employed) | 0.228  | 0.259   | -0.168     | 0.625      | 0.544                 |
|         | Work: Other not working | 0.487  | 0.139   | -0.159     | 1.133      | 0.363                 |
|         | COVID-19 infection*Retired | -0.052 | 0.941   | -1.439     | 1.335      | 0.980                 |
|         | COVID-19 infection*Other not working | 0.114 | 0.908   | -1.816     | 2.044      | 0.978                 |
|         | Wealth: Medium (vs High) | 0.447  | 0.009   | 0.113      | 0.781      | 0.044                 |
|         | Wealth: Low | 0.176   | 0.325   | -0.174     | 0.525      | 0.619                 |
|         | COVID-19 infection*Medium wealth | -0.040 | 0.947   | -1.215     | 1.135      | 0.980                 |
|         | COVID-19 infection*Low wealth | -0.160 | 0.797   | -1.386     | 1.065      | 0.967                 |
|         | Living alone | -0.669  | 0.000   | -0.992     | -0.345     | 0.001                 |
|         | COVID-19 infection*Living alone | -0.093 | 0.873   | -1.239     | 1.052      | 0.978                 |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; models adjusted for sex, age, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness and including interaction effects between COVID-19 infection and sociodemographic factors; June-July 2020 = COVID-19 assessment 1 (June-July 2020); Nov-Dec 2020 = COVID-19 assessment 2 (Nov-Dec 2020); CI = 95% confidence interval; FDR = false discovery rate.
Figure 1. Balance of the covariates in the treatment and control groups across the imputed datasets before and after propensity score weighting.

Note. Standardised mean differences.
Table 13. Associations between probable COVID-19 infection and mental health, financial hardship, and social connections (IPTW analyses).

| Outcome                  | Exposure            | OR/b         | p-value | CI (lower) | CI (upper) |
|--------------------------|---------------------|--------------|---------|------------|------------|
| **Mental Health**        | COVID-19 infection  |              |         |            |            |
|                          | (vs no infection)   |              |         |            |            |
| Depression, June-July 2020 (OR) | 1.355             | 0.010        | 1.075   | 1.708      |
| Depression, Nov-Dec 2020 (OR) | 1.468             | 0.000        | 1.189   | 1.813      |
| Anxiety, June-July 2020 (OR) | 1.591             | 0.003        | 1.167   | 2.169      |
| Anxiety, Nov-Dec 2020 (OR) | 1.689             | 0.000        | 1.275   | 2.239      |
| Poor QoL, June-July 2020 (b) | 0.929             | 0.008        | 0.240   | 1.618      |
| Poor QoL, Nov-Dec 2020 (b) | 1.327             | 0.000        | 0.638   | 2.016      |
| Loneliness, June-July 2020 (b) | 0.382             | 0.001        | 0.154   | 0.609      |
| Loneliness, Nov-Dec 2020 (b) | 0.244             | 0.039        | 0.012   | 0.475      |
| **Financial Hardship**   |                     |              |         |            |            |
| Worried, June-July 2020 (OR) | 1.216             | 0.079        | 0.977   | 1.514      |
| Worried, Nov-Dec 2020 (OR) | 1.145             | 0.234        | 0.916   | 1.431      |
| Worse off, June-July 2020 (OR) | 1.400             | 0.005        | 1.110   | 1.766      |
| Worse off, Nov-Dec 2020 (OR) | 1.166             | 0.225        | 0.910   | 1.493      |
| **Social Connections**   |                     |              |         |            |            |
| Infrequent contact with family, June-July 2020 (OR) | 0.799             | 0.298        | 0.525   | 1.218      |
| Infrequent contact with family, Nov-Dec 2020 (OR) | 1.067             | 0.701        | 0.768   | 1.482      |
| Infrequent contact with friends, June-July 2020 (OR) | 0.974             | 0.872        | 0.704   | 1.347      |
| Infrequent contact with friends, Nov-Dec 2020 (OR) | 1.032             | 0.829        | 0.776   | 1.373      |
| Infrequent contact with family/friends (total score), June-July 2020 (b) | -0.163            | 0.555        | -0.705  | 0.379      |
| Infrequent contact with family/friends (total score), Nov-Dec 2020 (b) | -0.003            | 0.991        | -0.506  | 0.500      |

Note. ELSA COVID-19 longitudinal sample (N=5146); pooled estimates across 20 imputed datasets; logistic/linear regression models weighted using propensity scores including sex, age, pre-COVID-19 outcomes, whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness, and the survey weights as predictors of the probability of probable COVID-19 infection; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; QoL = quality of life; IPTW = inverse probability of treatment weighting.
Figure 2. Associations of probable COVID-19 infection with mental health, financial hardship, and social connections (95% confidence intervals).

Note. ELSA COVID-19 longitudinal sample (N=5146); pooled estimates across 20 imputed datasets; Logistic/linear regression models: adjusted for sex, age, pre-COVID-19 outcomes, whether living alone, employment status, wealth, whether vulnerable to COVID-19, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), and limiting long-standing illness, and weighted using survey weights; Propensity score weighting: logistic/linear regression models weighted using propensity scores with sex, age, pre-COVID-19 outcomes, whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness, and survey weights as predictors of the probability of probable COVID-19 infection; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; QoL = quality of life.
Table 14. Associations of probable COVID-19 infection (definitions 2 and 3) with mental health, financial hardship, and social connections.

| Outcome | Exposure | OR/b | p-value | CI (lower) | CI (upper) |
|---------|----------|------|---------|------------|------------|
| Depression, June-July 2020 | COVID-19 infection, def 2 | 1.337 | 0.249 | 0.816 | 2.190 |
| Depression, Nov-Dec 2020 | COVID-19 infection, def 3 | 1.436 | 0.059 | 0.987 | 2.090 |
| Anxiety, June-July 2020 | COVID-19 infection, def 2 | 1.337 | 0.189 | 0.867 | 2.062 |
| Anxiety, Nov-Dec 2020 | COVID-19 infection, def 3 | 1.430 | 0.031 | 1.033 | 1.980 |
| Poor QoL, June-July 2020 | COVID-19 infection, def 2 | 1.695 | 0.155 | 0.818 | 3.511 |
| Poor QoL, Nov-Dec 2020 | COVID-19 infection, def 3 | 1.272 | 0.352 | 0.766 | 2.111 |
| Loneliness, June-July 2020 | COVID-19 infection, def 2 | 1.728 | 0.095 | 0.909 | 3.286 |
| Loneliness, Nov-Dec 2020 | COVID-19 infection, def 3 | 1.392 | 0.146 | 0.891 | 2.175 |
| Financial hardship – Worried, June-July 2020 | COVID-19 infection, def 2 | 1.182 | 0.018 | 0.205 | 2.159 |
| Financial hardship – Worried, Nov-Dec 2020 | COVID-19 infection, def 3 | 1.139 | 0.001 | 0.496 | 1.782 |
| Financial hardship – Wore off, June-July 2020 | COVID-19 infection, def 2 | 0.911 | 0.088 | 0.134 | 1.956 |
| Financial hardship – Wore off, Nov-Dec 2020 | COVID-19 infection, def 3 | 1.203 | 0.001 | 0.490 | 1.917 |
| Infrequent contact with family, June-July 2020 | COVID-19 infection, def 2 | 0.551 | 0.002 | 0.204 | 0.898 |
| Infrequent contact with family, Nov-Dec 2020 | COVID-19 infection, def 3 | 0.524 | 0.000 | 0.260 | 0.789 |
| Infrequent contact with friends, June-July 2020 | COVID-19 infection, def 2 | 0.727 | 0.499 | 0.358 | 1.407 |
| Infrequent contact with friends, Nov-Dec 2020 | COVID-19 infection, def 3 | 0.658 | 0.260 | 0.340 | 1.350 |
| Infrequent contact with friends (total score), June-July 2020 | COVID-19 infection, def 2 | 0.605 | 0.095 | 0.335 | 1.091 |
| Infrequent contact with friends (total score), Nov-Dec 2020 | COVID-19 infection, def 3 | 0.636 | 0.059 | 0.340 | 1.185 |
| Infrequent contact with friends (total score), June-July 2020 | COVID-19 infection, def 2 | 0.677 | 0.268 | 0.340 | 1.350 |
| Infrequent contact with friends (total score), Nov-Dec 2020 | COVID-19 infection, def 3 | 0.806 | 0.342 | 0.517 | 1.258 |

Note. Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from linear/logistic regression models across 20 imputed datasets, weighted using survey weights; Models adjusted for sex, age groups, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; QoL = quality of life; COVID-19 infection, def 2 = Positive COVID-19 test result, or hospitalisation due to COVID-19, or at least two of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste); COVID-19 infection, def 3 = Positive COVID-19 test result, or hospitalisation due to COVID-19, or a new continuous cough, or loss of sense of smell or taste.
**Table 15. Associations of probable COVID-19 infection with real-time contact with family.**

| Outcome                                                                 | Exposure                                      | OR    | p-value | CI (lower) | CI (upper) |
|-------------------------------------------------------------------------|-----------------------------------------------|-------|---------|------------|------------|
| **a) Overall**                                                          |                                               |       |         |            |            |
| Infrequent real-time contact with family, June-July 2020                | COVID-19 infection                            | 0.978 | 0.913   | 0.659      | 1.451      |
| Infrequent real-time contact with family, Nov-Dec 2020                  | COVID-19 infection                            | 0.890 | 0.529   | 0.618      | 1.280      |
| **b) Interaction effects with sociodemographic factors**                |                                               |       |         |            |            |
| Infrequent real-time contact with family, June-July 2020                | COVID-19 infection                            | 1.435 | 0.432   | 0.583      | 3.533      |
| Sex: Female (vs Male)                                                   |                                               | 0.598 | **0.000** | 0.471     | 0.759      |
| Age group: 60-74 (vs 52-59)                                             |                                               | 1.113 | 0.797   | 0.493      | 2.515      |
| Age group: 75+                                                          |                                               | 0.851 | 0.393   | 0.587      | 1.233      |
| COVID-19 infection*60-74                                                |                                               | 0.709 | 0.120   | 0.460      | 1.093      |
| COVID-19 infection*75+                                                  |                                               | 1.363 | 0.560   | 0.481      | 3.865      |
| Work: Retired (vs employed)                                             |                                               | 1.103 | 0.886   | 0.289      | 4.205      |
| Work: Other not working                                                 |                                               | 1.144 | 0.449   | 0.807      | 1.622      |
| COVID-19 infection*Retired                                              |                                               | 0.689 | 0.495   | 0.236      | 2.008      |
| COVID-19 infection*Other not working                                    |                                               | 0.764 | 0.727   | 0.168      | 3.479      |
| Wealth: Medium (vs High)                                                |                                               | 0.868 | 0.318   | 0.657      | 1.146      |
| Wealth: Low                                                             |                                               | 0.911 | 0.539   | 0.677      | 1.226      |
| COVID-19 infection*Medium wealth                                        |                                               | 0.405 | **0.047** | 0.166   | 0.990      |
| COVID-19 infection*Low wealth                                           |                                               | 0.654 | 0.342   | 0.272      | 1.572      |
| Living alone                                                            |                                               | 1.113 | 0.447   | 0.844      | 1.469      |
| COVID-19 infection*Living alone                                         |                                               | 0.800 | 0.137   | 0.942      | 1.550      |
| Infrequent real-time contact with family, Nov-Dec 2020                  | COVID-19 infection                            | 0.631 | 0.294   | 0.267      | 1.491      |
| Sex: Female (vs Male)                                                   |                                               | 0.492 | **0.000** | 0.396   | 0.613      |
| Age group: 60-74 (vs 52-59)                                             |                                               | 1.323 | 0.445   | 0.645      | 2.715      |
| Age group: 75+                                                          |                                               | 1.147 | 0.407   | 0.829      | 1.589      |
| COVID-19 infection*60-74                                                |                                               | 0.906 | 0.610   | 0.620      | 1.324      |
| COVID-19 infection*75+                                                  |                                               | 0.685 | 0.470   | 0.245      | 1.913      |
| Work: Retired (vs employed)                                             |                                               | 0.800 | 0.730   | 0.226      | 2.833      |
| Work: Other not working                                                 |                                               | 0.951 | 0.739   | 0.706      | 1.280      |
| COVID-19 infection*Retired                                              |                                               | 1.458 | 0.101   | 0.929      | 2.288      |
| COVID-19 infection*Other not working                                    |                                               | 2.236 | 0.120   | 0.811      | 6.165      |
| COVID-19 infection*Living alone                                         |                                               | 0.915 | 0.898   | 0.235      | 3.566      |
| Wealth: Medium (vs High)                                                |                                               | 0.936 | 0.601   | 0.729      | 1.201      |
| Wealth: Low                                                             |                                               | 1.039 | 0.768   | 0.804      | 1.344      |
| COVID-19 infection*Medium wealth                                        |                                               | 1.679 | 0.224   | 0.729      | 3.866      |
| COVID-19 infection*Low wealth                                           |                                               | 1.071 | 0.876   | 0.452      | 2.540      |
| Living alone                                                            |                                               | 1.208 | 0.137   | 0.942      | 1.550      |
| COVID-19 infection*Living alone                                         |                                               | 0.734 | 0.480   | 0.311      | 1.333      |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from logistic regression models across 20 imputed datasets, weighted using survey weights; Models adjusted for sex, age groups, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval.
### Table 16. Associations of probable COVID-19 infection with real-time contact with friends.

| Outcome                                                                 | Exposure                                                                 | OR   | p-value | CI (lower) | CI (upper) |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------|------|---------|------------|------------|
| **a) Overall**                                                          |                                                                          |      |         |            |            |
| Infrequent real-time contact with friends, June-July 2020               | COVID-19 infection                                                       | 0.861| 0.393   | 0.611      | 1.213      |
| Infrequent real-time contact with friends, Nov-Dec 2020                 | COVID-19 infection                                                       | 1.171| 0.323   | 0.856      | 1.600      |
| **b) Interaction effects with sociodemographic factors**                |                                                                          |      |         |            |            |
| Infrequent real-time contact with friends, June-July 2020               | COVID-19 infection                                                       | 0.446| 0.066   | 0.189      | 1.055      |
| Sex: Female (vs Male)                                                   |                                                                          | 0.573| **0.000**| 0.469      | 0.701      |
| COVID-19 infection*Female                                               |                                                                          | 1.989| **0.044**| 1.019      | 3.882      |
| Age group: 60-74 (vs 52-59)                                             |                                                                          | 1.013| 0.930   | 0.752      | 1.365      |
| Age group: 75+                                                          |                                                                          | 1.010| 0.955   | 0.712      | 1.433      |
| COVID-19 infection*60-74                                                |                                                                          | 0.924| 0.885   | 0.317      | 2.691      |
| COVID-19 infection*75+                                                  |                                                                          | 0.785| 0.712   | 0.217      | 2.839      |
| Work: Retired (vs employed)                                             |                                                                          | 0.688| **0.006**| 0.527      | 0.897      |
| Work: Other not working                                                 |                                                                          | 0.796| 0.303   | 0.516      | 1.229      |
| COVID-19 infection*Retired                                              |                                                                          | 2.482| 0.091   | 0.365      | 7.122      |
| COVID-19 infection*Other not working                                    |                                                                          | 2.380| 0.196   | 0.639      | 8.858      |
| Wealth: Medium (vs High)                                                |                                                                          | 0.965| 0.769   | 0.759      | 1.226      |
| Wealth: Low                                                             |                                                                          | 1.019| 0.886   | 0.793      | 1.309      |
| COVID-19 infection*Medium wealth                                       |                                                                          | 0.940| 0.874   | 0.439      | 2.013      |
| COVID-19 infection*Low wealth                                           |                                                                          | 0.679| 0.337   | 0.308      | 1.496      |
| Living alone                                                            |                                                                          | 0.556| **0.000**| 0.432      | 0.717      |
| COVID-19 infection*Living alone                                        |                                                                          | 1.652| 0.223   | 0.737      | 3.701      |
| Infrequent real-time contact with friends, Nov-Dec 2020                 | COVID-19 infection                                                       | 0.754| 0.471   | 0.349      | 1.626      |
| Sex: Female (vs Male)                                                   |                                                                          | 0.562| **0.000**| 0.468      | 0.674      |
| COVID-19 infection*Female                                               |                                                                          | 1.332| 0.355   | 0.725      | 2.447      |
| Age group: 60-74 (vs 52-59)                                             |                                                                          | 0.880| 0.336   | 0.678      | 1.142      |
| Age group: 75+                                                          |                                                                          | 0.870| 0.387   | 0.634      | 1.193      |
| COVID-19 infection*60-74                                                |                                                                          | 0.661| 0.348   | 0.279      | 1.568      |
| COVID-19 infection*75+                                                  |                                                                          | 0.943| 0.915   | 0.320      | 2.778      |
| Work: Retired (vs employed)                                             |                                                                          | 0.748| **0.016**| 0.591      | 0.947      |
| Work: Other not working                                                 |                                                                          | 1.217| 0.320   | 0.827      | 1.790      |
| COVID-19 infection*Retired                                              |                                                                          | 1.474| 0.392   | 0.606      | 3.588      |
| COVID-19 infection*Other not working                                    |                                                                          | 0.793| 0.682   | 0.262      | 2.405      |
| Wealth: Medium (vs High)                                                |                                                                          | 1.054| 0.623   | 0.855      | 1.298      |
| Wealth: Low                                                             |                                                                          | 0.895| 0.337   | 0.714      | 1.122      |
| COVID-19 infection*Medium wealth                                       |                                                                          | 1.257| 0.532   | 0.613      | 2.577      |
| COVID-19 infection*Low wealth                                           |                                                                          | 1.416| 0.363   | 0.669      | 2.998      |
| Living alone                                                            |                                                                          | 0.532| **0.000**| 0.421      | 0.671      |
| COVID-19 infection*Living alone                                        |                                                                          | 1.649| 0.183   | 0.790      | 3.443      |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146); pooled estimates from logistic regression models across 20 imputed datasets, weighted using survey weights; Models adjusted for sex, age groups, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval.
| Outcome | Exposure | OR/b | p-value | CI (lower) | CI (upper) | N |
|---------|----------|------|---------|------------|------------|---|
| Depression, June-July 2020 (OR) | COVID-19 infection (vs no infection) | 1.489 | 0.026 | 1.048 | 2.116 | 5016 |
| Anxiety, June-July 2020 (OR) | COVID-19 infection | 1.616 | 0.047 | 1.007 | 2.593 | 4855 |
| Anxiety, Nov-Dec 2020 (OR) | COVID-19 infection | 1.634 | 0.023 | 1.069 | 2.498 | 4854 |
| Poor QoL, June-July 2020 (b) | | 1.197 | 0.001 | 0.505 | 1.890 | 4898 |
| Poor QoL, Nov-Dec 2020 (b) | | 1.291 | 0.000 | 0.643 | 1.940 | 4899 |
| Loneliness, June-July 2020 (b) | | 0.495 | 0.000 | 0.242 | 0.747 | 4894 |
| Loneliness, Nov-Dec 2020 (b) | | 0.286 | 0.050 | 0.000 | 0.571 | 4897 |
| Financial Hardship: Worried, June-July 2020 (OR) | | 1.247 | 0.224 | 0.874 | 1.780 | 5069 |
| Financial Hardship: Worried, Nov-Dec 2020 (OR) | | 1.119 | 0.558 | 0.769 | 1.628 | 5070 |
| Financial Hardship: Worse off, June-July 2020 (OR) | | 1.530 | 0.008 | 1.115 | 2.099 | 5069 |
| Financial Hardship: Worse off, Nov-Dec 2020 (OR) | | 1.219 | 0.261 | 0.863 | 1.720 | 5068 |
| Infrequent contact: Family, June-July 2020 (OR) | | 0.794 | 0.413 | 0.457 | 1.379 | 4892 |
| Infrequent contact: Family, Nov-Dec 2020 (OR) | | 1.109 | 0.646 | 0.714 | 1.722 | 4898 |
| Infrequent contact: Friends, June-July 2020 (OR) | | 0.864 | 0.491 | 0.570 | 1.310 | 4901 |
| Infrequent contact: Friends, Nov-Dec 2020 (OR) | | 1.372 | 0.116 | 0.924 | 2.037 | 4902 |
| Infrequent contact: Total, June-July 2020 (b) | | -0.209 | 0.597 | -0.987 | 0.568 | 4902 |
| Infrequent contact: Total, Nov-Dec 2020 (b) | | 0.108 | 0.767 | -0.668 | 0.884 | 4902 |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146); estimates from linear/logistic regression models, weighted using survey weights; Models adjusted for sex, age groups, pre-COVID-19 outcome, Nov-Dec 2020 COVID-19 infection (Nov-Dec 2020 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; June-July 2020 = COVID-19 assessment 1; Nov-Dec 2020 = COVID-19 assessment 2; OR = odds ratio; CI = 95% confidence interval; QoL = quality of life.
| Outcome | Exposure | Model | OR   | p-value | CI (lower) | CI (upper) |
|---------|----------|-------|------|---------|------------|------------|
| a) Overall |          |       |      |         |            |            |
| Depression, COVID-19 w1 | COVID-19 infection | 1 | 1.617 | 0.005   | 1.158      | 2.258      |
| Depression, COVID-19 w2 | COVID-19 infection | 2 | 1.533 | 0.011   | 1.105      | 2.125      |
| COVID-19 infection |          | 1 | 1.564 | 0.003   | 1.169      | 2.092      |
| COVID-19 infection |          | 2 | 1.522 | 0.004   | 1.139      | 2.033      |
| b) Interaction effects with mental and physical health conditions |          |   |      |         |            |            |
| Depression, COVID-19 w1 | COVID-19 infection | 3 | 1.037 | 0.944   | 0.381      | 2.821      |
| Mental health condition |          | 3 | 2.306 | 0.000   | 1.620      | 3.283      |
| COVID-19 infection*Mental health condition |          | 3 | 2.513 | 0.069   | 0.931      | 6.781      |
| New physical health condition |          | 3 | 1.455 | 0.005   | 1.118      | 1.893      |
| COVID-19 infection*New physical health condition |          | 3 | 0.519 | 0.065   | 0.259      | 1.043      |
| Depression, COVID-19 w2 | COVID-19 infection | 3 | 1.519 | 0.345   | 0.637      | 3.622      |
| Mental health condition |          | 3 | 2.196 | 0.000   | 1.583      | 3.046      |
| COVID-19 infection*Mental health condition |          | 3 | 2.281 | 0.089   | 0.882      | 5.899      |
| New physical health condition |          | 3 | 1.319 | 0.012   | 1.062      | 1.638      |
| COVID-19 infection*New physical health condition |          | 3 | 0.827 | 0.564   | 0.435      | 1.575      |

Note. Sample: ELSA COVID-19 Substudy (N=5,146). Weighted pooled estimates from logistic regression models across 20 imputed datasets. Model 1: adjusted for sex, age groups, pre-COVID-19 depression, w2 COVID-19 infection (w2 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; Model 2: Model 1 + mental and physical health conditions; Model 3: Model 2 + interaction effects of COVID-19 infection with sex, age, employment status, wealth, whether living alone, mental health condition, and new physical health condition. OR = odds ratio. CI = 95% confidence interval. COVID-19 infection, def 1 = Positive COVID-19 test result; or hospitalisation due to COVID-19; or at least one of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste).
## Table 19. Associations between probable COVID-19 infection and Anxiety – Adjustment for and interactions with physical and mental health conditions.

| Outcome                          | Exposure                        | Model | OR   | p-value | CI (lower) | CI (upper) |
|---------------------------------|---------------------------------|-------|------|---------|------------|------------|
| **a) Overall**                  |                                 |       |      |         |            |            |
| Anxiety, COVID-19 w1            | COVID-19 infection              | 1     | 1.586| **0.049**| 1.003      | 2.508      |
|                                 | COVID-19 infection              | 2     | 1.519| 0.077   | 0.955      | 2.415      |
| Anxiety, COVID-19 w2            | COVID-19 infection              | 1     | 1.553| **0.041**| 1.018      | 2.370      |
|                                 | COVID-19 infection              | 2     | 1.465| 0.079   | 0.956      | 2.243      |
| **b) Interaction effects with mental and physical health conditions** |                                 |       |      |         |            |            |
| Anxiety, COVID-19 w1            | COVID-19 infection              | 3     | 0.578| 0.460   | 0.135      | 2.476      |
|                                 | Mental health condition         | 3     | 1.472| 0.096   | 0.934      | 2.322      |
|                                 | COVID-19 infection*Mental health condition | 3 | 1.035 | 0.954 | 0.322 | 3.326 |
|                                 | New physical health condition   | 3     | 1.433| **0.049**| 1.002      | 2.050      |
|                                 | COVID-19 infection*New physical health condition | 3 | 0.543 | 0.198 | 0.215 | 1.375 |
| Anxiety, COVID-19 w2            | COVID-19 infection              | 3     | 0.263| 0.085   | 0.058      | 1.201      |
|                                 | Mental health condition         | 3     | 0.288| 0.072   | 0.074      | 1.118      |
|                                 | COVID-19 infection*Mental health condition | 3 | 1.580 | 0.248 | 0.726 | 3.459 |
|                                 | New physical health condition   | 3     | 1.462| **0.026**| 1.046      | 2.042      |
|                                 | COVID-19 infection*New physical health condition | 3 | 1.580 | 0.248 | 0.726 | 3.459 |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146). Weighted pooled estimates from logistic regression models across 20 imputed datasets. Model 1: adjusted for sex, age groups, pre-COVID-19 anxiety, w2 COVID-19 infection (w2 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; Model 2: Model 1 + mental and physical health conditions; Model 3: Model 2 + interaction effects of COVID-19 infection with sex, age, employment status, wealth, whether living alone, mental health condition, and new physical health condition. OR = odds ratio. CI = 95% confidence interval. COVID-19 infection, def 1 = Positive COVID-19 test result; or hospitalisation due to COVID-19; or at least one of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste).
Table 20. Associations between probable COVID-19 infection and Poor Quality of Life (QoL) – Adjustment for and interactions with physical and mental health conditions.

| Outcome | Exposure | Model | b   | p-value | CI (lower) | CI (upper) |
|---------|----------|-------|-----|---------|------------|------------|
| **a) Overall** | | | | | | |
| Poor QoL, COVID-19 w1 | COVID-19 infection | 1 | 1.340 | **0.000** | 0.661 | 2.018 |
| | COVID-19 infection | 2 | 1.215 | **0.000** | 0.542 | 1.889 |
| Poor QoL, COVID-19 w2 | COVID-19 infection | 1 | 1.382 | **0.000** | 0.737 | 2.027 |
| | COVID-19 infection | 2 | 1.270 | **0.000** | 0.624 | 1.916 |
| **b) Interaction effects with mental and physical health conditions** | | | | | | |
| Poor QoL, COVID-19 w1 | COVID-19 infection | 3 | 0.755 | 0.288 | -0.639 | 2.149 |
| | Mental health condition | 3 | 0.616 | 0.135 | -0.192 | 1.424 |
| | COVID-19 infection*Mental health condition | 3 | 0.214 | 0.854 | -2.063 | 2.490 |
| | New physical health condition | 3 | 1.187 | **0.000** | 0.736 | 1.638 |
| | COVID-19 infection*New physical health condition | 3 | -0.062 | 0.925 | -1.341 | 1.218 |
| Poor QoL, COVID-19 w2 | COVID-19 infection | 3 | 0.857 | 0.297 | -0.754 | 2.469 |
| | Mental health condition | 3 | 0.901 | **0.013** | 0.192 | 1.610 |
| | COVID-19 infection*Mental health condition | 3 | -0.586 | 0.592 | -2.728 | 1.556 |
| | New physical health condition | 3 | 1.109 | **0.000** | 0.667 | 1.551 |
| | COVID-19 infection*New physical health condition | 3 | -0.019 | 0.977 | -1.300 | 1.263 |

Note. Sample: ELSA COVID-19 Substudy (N=5,146). Weighted pooled estimates from linear regression models across 20 imputed datasets. Model 1: adjusted for sex, age groups, pre-COVID-19 QoL, w2 COVID-19 infection (w2 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; Model 2: Model 1 + mental and physical health conditions; Model 3: Model 2 + interaction effects of COVID-19 infection with sex, age, employment status, wealth, whether living alone, mental health condition, and new physical health condition. QoL = quality of life. CI = 95% confidence interval. COVID-19 infection, def 1 = Positive COVID-19 test result; or hospitalisation due to COVID-19; or at least one of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste).
### Table 21. Associations between probable COVID-19 infection and Loneliness – Adjustment for and interactions with physical and mental health conditions.

| Outcome                          | Exposure                        | Model | b    | p-value | CI (lower) | CI (upper) |
|----------------------------------|---------------------------------|-------|------|---------|------------|------------|
| **a) Overall**                   |                                 |       |      |         |            |            |
| Loneliness, COVID-19 w1          | COVID-19 infection              | 1     | 0.491| 0.000   | 0.247      | 0.735      |
| Loneliness, COVID-19 w2          | COVID-19 infection              | 1     | 0.310| 0.024   | 0.042      | 0.577      |
| COVID-19 infection               | 2                               | 0.295 | 0.033| 0.024   | 0.566      |
| **b) Interaction effects with mental and physical health conditions** |                                 |       |      |         |            |            |
| Loneliness, COVID-19 w1          | COVID-19 infection              | 3     | 0.368| 0.183   | -0.173     | 0.910      |
| Mental health condition          | 3                               | 0.730 | 0.098| -0.134  | 1.595      |
| COVID-19 infection*Mental health condition | 3                             | 0.291 | 0.000| 0.151   | 0.431      |
| COVID-19 infection*New physical health condition | 3                               | -0.524| 0.031| -1.002  | -0.047     |
| Loneliness, COVID-19 w2          | COVID-19 infection              | 3     | 0.010| 0.973   | -0.545     | 0.565      |
| Mental health condition          | 3                               | 0.212 | 0.192| -0.107  | 0.530      |
| COVID-19 infection*Mental health condition | 3                             | 0.247 | 0.596| -0.666  | 1.159      |
| New physical health condition    | 3                               | 0.212 | 0.006| 0.062   | 0.362      |
| COVID-19 infection*New physical health condition | 3                               | -0.741| 0.002| -1.212  | -0.270     |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146). Weighted pooled estimates from linear regression models across 20 imputed datasets. Model 1: adjusted for sex, age groups, pre-COVID-19 loneliness, w2 COVID-19 infection (w2 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; Model 2: Model 1 + mental and physical health conditions; Model 3: Model 2 + interaction effects of COVID-19 infection with sex, age, employment status, wealth, whether living alone, mental health condition, and new physical health condition. CI = 95% confidence interval. COVID-19 infection, def 1 = Positive COVID-19 test result; or hospitalisation due to COVID-19; or at least one of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste).
## Table 22. Associations between probable COVID-19 infection and Worries about future financial situation – Adjustment for and interactions with physical and mental health conditions.

| Outcome | Exposure                                      | Model | OR   | p-value | CI (lower) | CI (upper) |
|---------|-----------------------------------------------|-------|------|---------|------------|------------|
| a) Overall |                                              |       |      |         |            |            |
| Worried, COVID-19 w1 | COVID-19 infection | 1     | 1.196| 0.318   | 0.842      | 1.699      |
| Worried, COVID-19 w2 | COVID-19 infection | 1     | 1.112| 0.571   | 0.770      | 1.606      |
|                  | COVID-19 infection | 2     | 1.069| 0.721   | 0.741      | 1.542      |
| b) Interaction effects with mental and physical health conditions |                        |       |      |         |            |            |
| Worried, COVID-19 w1 | COVID-19 infection | 3     | 1.410| 0.491   | 0.531      | 3.747      |
|                     | Mental health condition |       | 1.381| 0.106   | 0.934      | 2.043      |
|                     | COVID-19 infection*Mental health condition | 3     | 0.994| 0.991   | 0.319      | 3.094      |
|                     | New physical health condition |       | 0.962| 0.793   | 0.722      | 1.282      |
|                     | COVID-19 infection*New physical health condition | 3     | 1.390| 0.390   | 0.656      | 2.946      |
| Worried, COVID-19 w2 | COVID-19 infection | 3     | 1.229| 0.711   | 0.412      | 3.673      |
|                     | Mental health condition |       | 1.553| 0.028   | 1.050      | 2.296      |
|                     | COVID-19 infection*Mental health condition | 3     | 1.395| 0.537   | 0.484      | 4.019      |
|                     | New physical health condition |       | 1.253| 0.081   | 0.973      | 1.615      |
|                     | COVID-19 infection*New physical health condition | 3     | 1.297| 0.520   | 0.588      | 2.859      |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146). Weighted pooled estimates from logistic regression models across 20 imputed datasets. Model 1: adjusted for sex, age groups, pre-COVID-19 financial situation, w2 COVID-19 infection (w2 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; Model 2: Model 1 + mental and physical health conditions; Model 3: Model 2 + interaction effects of COVID-19 infection with sex, age, employment status, wealth, whether living alone, mental health condition, and new physical health condition. OR = odds ratio. CI = 95% confidence interval. COVID-19 infection, def 1 = Positive COVID-19 test result; or hospitalisation due to COVID-19; or at least one of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste).
Table 23. Associations between probable COVID-19 infection and Current financial situation compared with pre-COVID-19 – Adjustment for and interactions with physical and mental health conditions.

| Outcome | Exposure | Model | OR    | p-value | CI (lower) | CI (upper) |
|---------|----------|-------|-------|---------|-----------|------------|
| **a) Overall** | | | | | | |
| Worse off, COVID-19 w1 | COVID-19 infection | 1 | 1.502 | 0.011 | 1.099 | 2.053 |
| | COVID-19 infection | 2 | 1.496 | 0.012 | 1.093 | 2.047 |
| Worse off, COVID-19 w2 | COVID-19 infection | 1 | 1.156 | 0.407 | 0.821 | 1.629 |
| | COVID-19 infection | 2 | 1.151 | 0.420 | 0.818 | 1.620 |
| **b) Interaction effects with mental and physical health conditions** | | | | | | |
| Worse off, COVID-19 w1 | COVID-19 infection | 3 | 1.156 | 0.420 | 0.818 | 1.620 |
| Mental health condition | 3 | 1.191 | 0.382 | 0.805 | 1.763 |
| COVID-19 infection*Mental health condition | 3 | 0.684 | 0.462 | 0.248 | 1.763 |
| New physical health condition | 3 | 0.995 | 0.991 | 0.430 | 2.302 |
| COVID-19 infection*New physical health condition | 3 | 1.071 | 0.671 | 0.430 | 1.722 |
| Worse off, COVID-19 w2 | COVID-19 infection | 3 | 1.107 | 0.961 | 0.770 | 1.316 |
| Mental health condition | 3 | 1.014 | 0.946 | 0.669 | 1.538 |
| COVID-19 infection*Mental health condition | 3 | 0.434 | 0.155 | 0.138 | 1.370 |
| New physical health condition | 3 | 1.434 | 0.378 | 0.667 | 2.907 |
| COVID-19 infection*New physical health condition | 3 | 0.454 | 0.155 | 0.138 | 1.370 |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146). Weighted pooled estimates from logistic regression models across 20 imputed datasets. Model 1: adjusted for sex, age groups, pre-COVID-19 financial situation, w2 COVID-19 infection (w2 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; Model 2: Model 1 + mental and physical health conditions; Model 3: Model 2 + interaction effects of COVID-19 infection with sex, age, employment status, wealth, whether living alone, mental health condition, and new physical health condition. OR = odds ratio. CI = 95% confidence interval. COVID-19 infection, def 1 = Positive COVID-19 test result; or hospitalisation due to COVID-19; or at least one of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste).
| Outcome | Exposure | Model | OR  | p-value  | CI (lower) | CI (upper) |
|---------|----------|-------|-----|----------|------------|------------|
| a) Overall | Infrequent real-time/written contact with family, COVID-19 w1 | COVID-19 infection | 1  | 0.698 | 0.184 | 0.410 | 1.187 |
| | | COVID-19 infection | 2  | 0.699 | 0.190 | 0.410 | 1.193 |
| | Infrequent real-time/written contact with family, COVID-19 w2 | COVID-19 infection | 1  | 0.998 | 0.991 | 0.649 | 1.533 |
| | | COVID-19 infection | 2  | 1.021 | 0.923 | 0.666 | 1.566 |
| b) Interaction effects with mental and physical health conditions | Infrequent real-time/written contact with family, COVID-19 w1 | COVID-19 infection | 3  | 0.277 | 0.190 | 0.041 | 1.889 |
| | | Mental health condition | 3  | 0.955 | 0.858 | 0.576 | 1.582 |
| | | COVID-19 infection*Mental health condition | 3  | 0.700 | 0.741 | 0.084 | 5.801 |
| | | New physical health condition | 3  | 1.057 | 0.776 | 0.722 | 1.546 |
| | | COVID-19 infection*New physical health condition | 3  | 0.761 | 0.655 | 0.230 | 2.521 |
| | Infrequent real-time/written contact with family, COVID-19 w2 | COVID-19 infection | 3  | 0.669 | 0.472 | 0.224 | 1.996 |
| | | Mental health condition | 3  | 0.979 | 0.937 | 0.577 | 1.662 |
| | | COVID-19 infection*Mental health condition | 3  | 2.515 | 0.178 | 0.658 | 9.608 |
| | | New physical health condition | 3  | 0.720 | 0.044 | 0.524 | 0.990 |
| | | COVID-19 infection*New physical health condition | 3  | 2.254 | 0.074 | 0.924 | 5.499 |

Note. Sample: ELSA COVID-19 Substudy (N=5,146). Weighted pooled estimates from logistic regression models across 20 imputed datasets. Model 1: adjusted for sex, age groups, pre-COVID-19 social isolation, w2 COVID-19 infection (w2 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; Model 2: Model 1 + mental and physical health conditions; Model 3: Model 2 + interaction effects of COVID-19 infection with sex, age, employment status, wealth, whether living alone, mental health condition, and new physical health condition. OR = odds ratio. CI = 95% confidence interval. COVID-19 infection, def 1 = Positive COVID-19 test result; or hospitalisation due to COVID-19; or at least one of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste). NA = no probable COVID-19 cases in the 'other not working' who reported infrequent contact with family.
**Table 25. Associations between probable COVID-19 infection and Infrequent real-time/written contact with friends – Adjustment for and interactions with physical and mental health conditions.**

| Outcome | Exposure | Model | OR  | p-value | CI (lower) | CI (upper) |
|---------|----------|-------|-----|---------|------------|------------|
| Infrequent real-time/written contact with friends, COVID-19 w1 | COVID-19 infection | 1 | 0.793 | 0.259 | 0.530 | 1.187 |
| COVID-19 infection | 2 | 0.796 | 0.269 | 0.532 | 1.192 |
| Infrequent real-time/written contact with friends, COVID-19 w2 | COVID-19 infection | 1 | 1.252 | 0.248 | 0.855 | 1.835 |
| COVID-19 infection | 2 | 1.277 | 0.211 | 0.871 | 1.871 |

**b) Interaction effects with mental and physical health conditions**

| Infrequent real-time/written contact with friends, COVID-19 w1 | COVID-19 infection | Mental health condition | 3 | 0.384 | 0.117 | 0.116 | 1.269 |
| COVID-19 infection*Mental health condition | 3 | 1.954 | 0.242 | 0.636 | 6.000 |
| New physical health condition | 3 | 0.987 | 0.932 | 0.733 | 1.329 |
| COVID-19 infection*New physical health condition | 3 | 1.389 | 0.518 | 0.513 | 3.765 |
| Mental health condition | 3 | 0.777 | 0.321 | 0.472 | 1.279 |
| COVID-19 infection*Mental health condition | 3 | 1.225 | 0.748 | 0.356 | 4.214 |
| New physical health condition | 3 | 0.874 | 0.338 | 0.663 | 1.152 |
| COVID-19 infection*New physical health condition | 3 | 1.081 | 0.849 | 0.483 | 2.422 |

**Note.** Sample: ELSA COVID-19 Substudy (N=5,146). Weighted pooled estimates from logistic regression models across 20 imputed datasets. Model 1: adjusted for sex, age groups, pre-COVID-19 social isolation, w2 COVID-19 infection (w2 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; Model 2: Model 1 + mental and physical health conditions; Model 3: Model 2 + interaction effects of COVID-19 infection with sex, age, employment status, wealth, whether living alone, mental health condition, and new physical health condition. OR = odds ratio. CI = 95% confidence interval. COVID-19 infection, def 1 = Positive COVID-19 test result; or hospitalisation due to COVID-19; or at least one of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste).
Table 26. Associations between probable COVID-19 infection and Infrequent real-time/written contact with family and friends (total continuous score) – Adjustment for and interactions with physical and mental health conditions.

| Outcome | Exposure | Model | b     | p-value | CI (lower) | CI (upper) |
|---------|----------|-------|-------|---------|-----------|------------|
| a) Overall | Infrequent real-time/written contact with family/friends, COVID-19 w1 | COVID-19 infection | 1 | -0.178 | 0.483 | -0.676 | 0.320 |
| | | COVID-19 infection | 2 | -0.155 | 0.542 | -0.653 | 0.343 |
| | Infrequent real-time/written contact with family/friends, COVID-19 w2 | COVID-19 infection | 1 | 0.039 | 0.871 | -0.433 | 0.511 |
| | | COVID-19 infection | 2 | 0.385 | 0.611 | -1.099 | 1.869 |
| b) Interaction effects with mental and physical health conditions | Infrequent real-time/written contact with family/friends, COVID-19 w1 | COVID-19 infection | 3 | 0.385 | 0.611 | -1.099 | 1.869 |
| | | Mental health condition | 3 | 0.139 | 0.625 | -0.417 | 0.695 |
| | | COVID-19 infection*Mental health condition | 3 | 1.395 | 0.106 | -0.299 | 3.089 |
| | | New physical health condition | 3 | -0.325 | 0.060 | -0.664 | 0.013 |
| | | COVID-19 infection*New physical health condition | 3 | -0.103 | 0.854 | -1.196 | 0.990 |
| | Infrequent real-time/written contact with family/friends, COVID-19 w2 | COVID-19 infection | 3 | 0.124 | 0.862 | -1.281 | 1.530 |
| | | Mental health condition | 3 | 0.193 | 0.472 | -0.334 | 0.720 |
| | | COVID-19 infection*Mental health condition | 3 | 1.177 | 0.151 | -0.430 | 2.785 |
| | | New physical health condition | 3 | -0.279 | 0.088 | -0.599 | 0.042 |
| | | COVID-19 infection*New physical health condition | 3 | -0.040 | 0.940 | -1.075 | 0.996 |

Note. Sample: ELSA COVID-19 Substudy (N=5,146). Weighted pooled estimates from linear regression models across 20 imputed datasets. Model 1: adjusted for sex, age groups, pre-COVID-19 social isolation, w2 COVID-19 infection (w2 outcome only), whether living alone, employment status, wealth, whether vulnerable to COVID-19, limiting long-standing illness; Model 2: Model 1 + mental and physical health conditions; Model 3: Model 2 + interaction effects of COVID-19 infection with sex, age, employment status, wealth, whether living alone, mental health condition, and new physical health condition. CI = 95% confidence interval. COVID-19 infection, def 1 = Positive COVID-19 test result; or hospitalisation due to COVID-19; or at least one of the three core symptoms as defined by NHS England (i.e. high temperature, new continuous cough, and loss of sense of smell/taste).
### Table 27. Relationship between pre-pandemic psychological distress and probable COVID-19 infection.

| Outcome                                      | Exposure                                      | OR    | p-value | CI lower | CI upper |
|----------------------------------------------|-----------------------------------------------|-------|---------|----------|----------|
| Probable COVID-19 infection (June-July 2020) | Pre-pandemic Depression (2018-19)             | 1.944 | 0.001   | 1.327    | 2.848    |
|                                              | Pre-pandemic Anxiety – ONS scale (2018-19)    | 1.039 | 0.139   | 0.988    | 1.093    |
|                                              | Pre-pandemic Poor Quality of Life (2018-19)   | 1.043 | 0.000   | 1.019    | 1.068    |
|                                              | Pre-pandemic Loneliness (2018-19)             | 1.035 | 0.322   | 0.967    | 1.107    |

*Note.* Sample: ELSA COVID-19 Substudy (N=5,146); weighted pooled estimates from logistic regression models across 20 imputed datasets; separate models were fitted to test the association between each mental health outcome and probable COVID-19 infection, with adjustment for sex, age groups, whether living alone, employment status, wealth, whether vulnerable to COVID-19, and limiting long-standing illness; OR = odds ratio; CI = 95% confidence interval.