

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
☐	☒ The exact sample size (<i>n</i>) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒ The statistical test(s) used AND whether they are one- or two-sided <i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i>
☐	☒ A description of all covariates tested
☐	☒ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒ For null hypothesis testing, the test statistic (e.g. <i>F</i> , <i>t</i> , <i>r</i>) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> value noted <i>Give P values as exact values whenever suitable.</i>
☒	☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☒	☐ Estimates of effect sizes (e.g. Cohen's <i>d</i> , Pearson's <i>r</i>), indicating how they were calculated

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection	Longitudinal cohort studies to include in the meta-analysis were identified through the Gateway to Global Aging (https://g2aging.org) portal and searches through PubMed, Web of Science, APA PsycNet, and Science Direct. Pre-print archives (medRxiv and PsyArXiv) were also searched. No commercial, open source, or costume code software were used.
Data analysis	Statistical analysis of selected public cohort studies were conducted with SPSS (version 18). Data extraction from the literature was conducted using excel. The meta-analysis was conducted in R software, version 4.2.3 (2023-03-15 ucrt) -- "Shortstop Beagle". Package: metafor. The R script that supports meta-analytic results is available in the Open Science Framework repository for social sciences. Access link: https://osf.io/tfphs/ (Luchetti et al. Loneliness and risk for dementia. doi: 10.17605/OSF.IO/TFPHS).

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

The present study includes a coordinated analysis of data from eight public cohort studies: HRS, <https://hrs.isr.umich.edu/data-products>; ELSA, <https://www.elsa-project.ac.uk/accessing-elsa-data>; SHARE, <https://share-eric.eu/data/data-access>; TILDA, <https://www.icpsr.umich.edu/web/ICPSR/series/726>; MHAS, <https://www.mhasweb.org/DataProducts/Home.aspx>; KLoSA, <https://survey.keis.or.kr/eng/myinfo/login.jsp>; CHARLS, <https://charls.charlsdata.com/pages/data/111/en.html>, and HILDA, <https://melbourneinstitute.unimelb.edu.au/hilda/for-data-users>. Our access to the data does not allow for data redistribution. Individual researchers can access data from each of these studies after registration at each study data portal; we described each cohort in detail in Supplementary Information.

Data for the meta-analysis are available in the Open Science Framework repository for social sciences. Access link: <https://osf.io/tfphs/> (Luchetti et al. Loneliness and risk for dementia. doi: 10.17605/OSF.IO/TFPHS).

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\)](#), [and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender	We tested sex (percentage of female individuals) as a moderator in the meta-analysis.
Reporting on race, ethnicity, or other socially relevant groupings	We were not able to test race and/or ethnicity as a moderator in the meta-analysis because only few studies reported information on sample race/ethnicity.
Population characteristics	The meta-analysis included studies that assessed middle age and older adults (40 and older) without cognitive impairment at the baseline assessment. Age and cognitive status were the main selection criteria for inclusion in the meta-analysis. Additional relevant information included sex, education, race/ethnicity (if reported by the study), but no exclusion was made based on this population characteristics.
Recruitment	No recruitment of new participants. We conducted a secondary data analysis of public longitudinal cohort studies and combined this data with the published literature in a meta-analysis.
Ethics oversight	Each cohort study analyzed in this work have been approved by the respective institutional review boards. A statement is provided in the Acknowledgments and Methods.

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☒ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/documents/nr-reporting-summary-flat.pdf](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

Behavioural & social sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	Quantitative synthesis. Meta-analysis of longitudinal observational studies.
Research sample	Public data from ongoing aging cohort studies were identified through the Gateway to Global Aging (https://g2aging.org) portal. To be selected, the cohort had to include a measure of loneliness and repeated assessment of cognitive status. We included all data available that were relevant for the analysis. Selected cohort studies: HRS (US), https://hrs.isr.umich.edu/data-products ; ELSA (UK), https://www.elsa-project.ac.uk/accessing-elsa-data ; SHARE (EUROPE), https://share-eric.eu/data/data-access ; TILDA (Ireland), https://www.icpsr.umich.edu/web/ICPSR/series/726 ; MHAS (Mexico), https://www.mhasweb.org/DataProducts/Home.aspx ; KLoSA (Korea), https://survey.keis.or.kr/eng/myinfo/login.jsp ;

CHARLS (China), <https://charls.charlsdata.com/pages/data/111/en.html>;

HILDA (Australia), <https://melbourneinstitute.unimelb.edu.au/hilda/for-data-users>.

Each of the selected cohorts (aged 40 and older) are representative of the aging populations of each country. A detailed description of each cohort is provided in Supplementary Information.

Studies from the literature were identified through searches in PubMed, Web of Science, APA PsycNet, Science Direct, and pre-print archives.

Sampling strategy

We analyzed existing datasets that are publicly available to researchers. We did not collect data or recruited any new participants. Such datasets include large population samples and have been considered sufficiently powered to detect small-to-medium associations.

Studies from the literature were included if the following criteria were met: (1) Study design: Longitudinal, observational studies. (2) Study population: Middle aged and older adults at baseline who did not have dementia at the baseline assessment of loneliness, non-clinical samples. (3) Assessment of dementia and/or cognitive impairment: Studies that reported cognitive status at baseline and follow-up, through clinical diagnosis, self/proxy reports of diagnosis, neuropathological evaluation, or cut-off for cognitive performance. (4) Assessment of loneliness: Studies that measured loneliness, whether through a single item or a multi-item scale, and whether through direct questions (e.g., 'Do you feel lonely?') or validated scales (e.g., UCLA Loneliness Scale).

Data collection

Not applicable. We analyzed existing datasets that are publicly available to researchers. We did not collect new data or recruited any participants. Results from the existing datasets were combined with results from the literature.

Timing

Not applicable. We analyzed existing datasets that are publicly available to researchers.

Literature searches were performed between May 2022 and September 2023, and updated on March 18, 2024.

Data exclusions

Studies that assessed loneliness in clinical samples or individuals with dementia/cognitive impairment were excluded.

Non-participation

Not applicable. We analyzed existing datasets that are publicly available to researchers. We did not collect new data or recruited any participants. Results from the existing datasets were combined with results published in the literature.

Randomization

Not applicable. We analyzed existing datasets that are publicly available observational cohort studies. Results from the existing datasets were combined with results from other longitudinal observational studies published in the literature.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern
☒	☐ Plants

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Plants

Seed stocks

Not applicable

Novel plant genotypes

Not applicable.

Authentication

Not applicable.