# Supplementary appendix

**S1: differences in data-cleaning.**

The tables below display the discrepancies between our analysis and that by Jiang et al. (2023) 1 regarding numbers of observations removed due to various criteria (**left**) and the numbers of missing observations for each variable (**right**). In the left table, each row depicts the number of observations removed at each data-cleaning step (no shading) and the numbers of observations remaining in the sample prior to and after data cleaning (grey shading). The table on the right displays the numbers of missing observations for each variable that was used as a confounder in the analyses. Jiang et al. reported only the total number of missing observations across confounder variables. The numbers for our data cleaning are based on preparation for the default analysis (see **S5**).

|  |  |  |
| --- | --- | --- |
| **Step** | **Jiang et al.** | **Mur et al.** |
| Initial sample size | 502,506 | 502,359 |
| No hearing assessment | 25,081 | 24,963 |
| Dementia at baseline | 283 | 217 |
| Hearing aid use but no hearing loss |  | 213 |
| Missing confounder data | 39,348 | 160,752 |
| Final sample size | 437,704 | 316,214 |

|  |  |  |
| --- | --- | --- |
| **Variable** | **Jiang et al.** | **Mur et al.\*** |
| Sex |  | 0 |
| Ethnicity |  | 1,603 |
| Education |  | 5,016 |
| Income |  | 68,298 |
| Deprivation |  | 591 |
| Smoking |  | 1,773 |
| Alcohol |  | 418 |
| Physical activity |  | 17,886 |
| BMI |  | 2,494 |
| Hypertension |  | 194 |
| Diabetes |  | 0 |
| CVD |  | 942 |
| APOE allele status |  | 91,988 |
| Total | 39,438 | 160,752 |

\*The total number of removed observations does not equal the sum of the missing observations across all variables, because one observation can be missing data for several variables.

**S2:** comparison of descriptive statistics between the two analyses. The numbers from our analyses in the third column are based on the data cleaning for the default analysis (**S5**).

|  |  |  |
| --- | --- | --- |
| **Hearing** | **Jiang et al. n (%)** | **Mur et al. n (%)** |
| Without hearing loss | 325,882 (74) | 236,239 (75) |
| Hearing loss without hearing aids | 98,730 (23) | 70,975 (22) |
| Hearing loss with hearing aids | 13,092 (3) | 9,000 (3) |
| **Age at baseline, years** |  |  |
| 40-49 | 102,116 (23) | 79,483 (25) |
| 50-59 | 167,409 (38) | 108,211 (34) |
| 60-69 | 168,179 (38) | 127,147 (40) |
| >69 |  | 1,373 (1) |
| **Sex** |  |  |
| Female | 235,249 (54) | 165,618 (52) |
| Male | 202,455 (46) | 150,596 (48) |
| **Ethnicity** |  |  |
| White | 416,131 (95) | 300,796 (95) |
| Asian or Asian British | 8,327 (2) | 6,350 (2) |
| Black or Black British | 6,135 (1) | 4,537 (1) |
| Other | 7,111 (2) | 4,531 (1) |
| **Income** |  |  |
| Level 1 (<£18,000) | 97,236 (22) | 67,132 (21) |
| Level 2 (£18,000-30,999) | 106,630 (24) | 79,658 (25) |
| Level 3 (£31,000-52,000) | 113,589 (26) | 83,989 (27) |
| Level 4 (>£52,000) | 120,249 (27) | 85,435 (27) |
| **Townsend deprivation index quartile** |  |  |
| Q1 (least deprived) | 112,182 (26) | 82,171 (26) |
| Q2 | 110,060 (25) | 80,658 (26) |
| Q3 | 109,650 (25) | 79,911 (25) |
| Q4 (most deprived) | 105,812 (24) | 73,474 (23) |
| **BMI, kg/m2** |  |  |
| <18.5 | 2,209 (1) | 1,619 (1) |
| >=18.5 to <25.0 | 143,832 (33) | 105,757 (33) |
| >= 25.0 to <30.0 | 186,713 (43) | 135,802 (43) |
| >= 30.0 | 104,950 (23) | 73,036 (23) |
| **Smoking status** |  |  |
| Never | 239,864 (55) | 174,151 (55) |
| Past | 152,767 (35) | 111,966 (35) |
| Current | 45,073 (10) | 30,097 (10) |
| **Alcohol intake** |  |  |
| Daily or almost daily | 91,308 (21) | 67,765 (21) |
| 3-4 times a week | 103,199 (23) | 77,135 (24) |
| 1-2 times a week | 113,241 (26) | 81,696 (26) |
| Occasionally | 96,732 (22) | 67,696 (21) |
| Never | 33,224 (8) | 21,922 (7) |
| **Diabetes** | 23,170 (5) | 14,967 (5) |
| **Hypertension** | 121,709 (28) | 87,445 (28) |
| **Cardiovascular disease (CVD)** | 25,262 (6) | 16,446 (5) |
| **APOE e4** |  |  |
| 0 | 332,189 (76) | 231,719 (73) |
| 1 | 96,738 (22) | 76,721 (24) |
| 2 | 8,777 (2) | 7,774 (2) |

**S3**: Comparison of case numbers between groups for different sources of dementia diagnoses. We attempted replication using three different approaches of dementia ascertainment. In *manual search*, we used the codes as described by Jiang et al. and searched the inpatient and death records for matches. *FOs* refer to first outcomes, UK Biobank variables derived by taking the earliest diagnosis when using data from primary care, inpatient hospital records, death records, and self-reported medical conditions (category ID 1712). *ADOs* refer to algorithmically-defined outcomes, i.e., UK Biobank variables derived by using data from self-reported medical information, inpatient hospital records, and death records. It was developed by the UK Biobank Outcome Adjudication group for some health outcomes to maximise the positive predictive values.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Source of diagnosis** | **Jiang et al.** n (%) | | **Mur et al.** n (%) | | | | | |
| **Outcome ascertainment** |  | | **Manual search** | | **FOs** | | **ADOs** | |
| **Dementia** | **No** | **Yes** | **No** | **Yes** | **No** | **Yes** | **No** | **Yes** |
| **Without HL** | 322,867 (75) | 3,015 (52) | 233,756 (74) | 2,520 (63) | 233,828 (75) | 2,420 (64) | 233,683 (75) | 2,556 (64) |
| **HL, without HA** | 96,085 (22) | 2,645  (45) | 69,899 (22) | 1,098 (28) | 69,921 (22) | 1,052 (28) | 69,864 (22) | 1,111 (28) |
| **HL with HA** | 12,922 (3) | 170  (3) | 8,694 (3) | 314 (8) | 8,697 (3) | 304 (8) | 8,687 (3) | 313 (8) |

**S4: variables with insufficient information.**

**Hearing aids**: it is unclear what the authors did with the participants without hearing loss who indicated to be using hearing aids (n=214). We removed those participants as indicated in **S1**.

**Income**:it is unclear how the authors dealt with responses that do not fall within the income categorisation schema as presented in the paper. The UK Biobank data showcase for field ID 738 during the baseline assessment visit indicates that 21,299 and 49,825 individuals responded with “do not know” or “prefer not to answer” to the question for this variable, respectively (<https://biobank.ndph.ox.ac.uk/showcase/field.cgi?id=738>). While the numbers of participants for the lowest two income categories as reported in Jiang et al. correspond roughly to the numbers reported by UK Biobank, the numbers of participants for the highest two income categories are higher in the paper by Jiang et al. than is reported by UK Biobank. For the highest income category (>£52,000)[[1]](#footnote-1), UK Biobank reports a total of 109,166 observations, while Jiang et al. reported 120,249 observations. For the second highest income category (£31,000-£52,000), UK Biobank reports 86,243 observations, while Jiang et al. reported 113,589 observations. It is unclear whether the 21,999 and 49,825 participants noted above were somehow recoded, and if so, how.

**Ethnicity**: is it unclear how the authors re-classified the variable at field ID 21000. We included classes 1, 1001, 1002, 1003 under “white”; classes 3, 3001, 3002, 3003, 3004, 5 under “Asian”; classes 4, 4003, 4001, 4002 under “black”; classes 2, 6, 2001, 2002, 2003, 2004, 6 under “other”.

**Education**: Jiang et al. used field IDs 6138 (“qualifications”) and 845 (“age completed full time education”), but it is unclear how these were used to derive “years of education” used in their analyses. We used only field ID 6138 and classified it as did Stevenson et al. (2021) 2.

**Physical activity**: it is unclear how Jiang et al. categorised those participants without information on IPAQ groups (field ID 22032). The authors write that they used the number of moderate activity days/week (field 884 ID), but no further details are given. We used <https://biobank.ndph.ox.ac.uk/showcase/refer.cgi?id=540> to inform our choice; we set MET to 0, 1, and 2 for those reporting 0-2, 3-6, and 7 moderate activity days/week, respectively.

**Dementia diagnosis**: the UK Biobank Outcome Adjudication Group released codes that Jiang et al. reported to use. However, the authors did not seem to use all of the codes provided by UK Biobank (<https://biobank.ndph.ox.ac.uk/showcase/refer.cgi?id=460>), e.g., ICD9 code 331. Moreover, they seemingly used these codes to search the inpatient record and it is unclear whether they also used death records. Variables for dementias that use both sources are also available from UK Biobank   
([https://biobank.ndph.ox.ac.uk‌/showcase/label.cgi?id=47](https://biobank.ndph.ox.ac.uk/showcase/label.cgi?id=47); field ID 42018 for all-cause dementia, 42021 for Alzheimer’s disease, and 42022 for vascular dementia).

**Follow-up**: follow-up was calculated as the time difference between the date of baseline assessment and the date of either death, diagnosis of dementia, or right-censoring due to data ascertainment, whichever came first. However, this raises a few questions:

* As the authors noted, right-censoring differs between the three nations (England, Scotland, Wales) and each participant may have (inpatient and primary care) records in multiple nations at different points in time. We used the data provider of the latest inpatient diagnosis for our analysis (which left 54,411 participants without a date of right-censoring) and supplemented it with the data provider of the latest GP diagnosis (which left 30,233 participants without a date of right-censoring).
* The above approach excludes individuals without any inpatient or primary care records, and it is unclear how Jiang et al. determined the dates of right-censoring for those individuals. We set the date of right-censoring for those individuals at the date of the earliest of the three data providers (Patient Episode Database for Wales; 28.02.2018). This left us with 91 and 835 participants that were diagnosed with dementia[[2]](#footnote-2) or that died after their dates of right-censoring, respectively. For those participants, we shifted their censoring dates to their dates of dementia or – if they died – death. That way, we prevented those individuals from being right-censored before their diagnoses of dementia and/or death.

**S5**: Description of the default analysis and the sensitivity analyses. The bullet points for the default analysis describes our choice for dealing with that variable in the default analysis. The bullet points for the sensitivity analyses describe the variation of that variable that was used for each sensitivity analysis. For example, if a sensitivity analysis (results presented in **S6-7**) is labelled 2-3a, it means that prior to analysis, participants with no censoring date were removed (2) and that those with dementia or death dates after right-censoring were removed (3a); all other steps in this example would be done as per default.

**Default analysis**:

* Dementia diagnosis: use algorithmically-defined outcomes (ADOs).
* Hearing aids: recode missing observations as no hearing loss.
* Covariates: remove observations with missing data for any covariate prior to adjusted and unadjusted analyses.
* Follow-up:
  + Define source nation (England/Scotland/Wales) based on source of most recent medical record.
  + Prioritise inpatient records (category ID 2000); for those without inpatient records use GP records (field ID 42040).
  + For those missing both inpatient and GP records, set follow-up date to the earliest date of right-censoring (Wales, 28.02.2018).
* Dementia and/or death dates:
  + For those that were diagnosed with dementia after their date of right-censoring, shift the date of right-censoring to the date of dementia diagnosis.
  + For those that died after their date of right-censoring (but who were not diagnosed with dementia), shift the date of right-censoring to the date of death.

**Sensitivity analyses**:

1. Follow-up calculation:

Use only inpatient records to determine right-censoring.

1. Missing censoring date
   1. Remove.
   2. Use the most common date (England, 31.10.2022).
2. Dementia and/or death dates
   1. Remove those with dementia/death after right-censoring.
   2. Set to control those with dementia/death after right-censoring.
3. Dementia ascertainment:
   1. Use the ICD codes used by Jiang et al. and search the inpatient records.
   2. Use first occurrences.
4. Covariates:

Only remove missing observations of covariates that are used in the present model.

**S6**: Results for analyses predicting dementia as the outcome, with hearing loss as the exposure, expressed as hazards ratios (HR), using Cox proportional hazards models. The tables contain the results for two groups: those participants who wore hearing aids at baseline and those who did not, in each analysis compared to those without hearing loss. Each analysis was done both unadjusted and fully adjusted using confounders as per Jiang et al. The rows for the fully adjusted analyses for sensitivity analyses 5 are greyed out because partial removal of observations by selection of covariates made no sense in the context of full adjustment (see **S5**). Due to the similarity of effect sizes across sensitivity analyses for all-cause dementia (**A**), fewer sensitivity analyses were run for Alzheimer’s disease (**B**) and vascular dementia (**C**) than for all-cause dementia.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **A** |  | **Simple adjustment** | | **Full adjustment** | |
| **Analysis** | **N** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** |
| Default | 316,214 | 1.49 (1.32-1.67) | 1.12 (1.04-1.20) | 1.30 (1.15-1.46) | 1.07 (0.99-1.15) |
| 1 | 316,214 | 1.47 (1.31-1.66) | 1.11 (1.03-1.19) | 1.29 (1.15-1.46) | 1.06 (0.99-1.14) |
| 2a | 295,779 | 1.49 (1.32-1.68) | 1.12 (1.04-1.20) | 1.30 (1.15-1.47) | 1.07 (0.99-1.15) |
| 2b | 316,214 | 1.51 (1.34-1.70) | 1.13 (1.05-1.21) | 1.31 (1.16-1.48) | 1.08 (1.00-1.16) |
| 3a | 316,162 | 1.50 (1.33-1.68) | 1.12 (1.04-1.20) | 1.31 (1.16-1.48) | 1.07 (1.00-1.15) |
| 3b | 316,214 | 1.50 (1.33-1.68) | 1.12 (1.04-1.20) | 1.31 (1.16-1.48) | 1.07 (1.00-1.15) |
| 4a | 316,281 | 1.50 (1.33-1.69) | 1.11 (1.04-1.20) | 1.31 (1.17-1.47) | 1.07 (0.99-1.15) |
| 4b | 316,222 | 1.49 (1.33-1.69) | 1.11 (1.03-1.19) | 1.31 (1.16-1.47) | 1.06 (0.99-1.14) |
| 1-2a | 279,362 | 1.48 (1.31-1.66) | 1.11 (1.03-1.19) | 1.30 (1.15-1.46) | 1.06 (0.99-1.14) |
| 1-2a-3a | 279,315 | 1.49 (1.32-1.67) | 1.12 (1.04-1.20) | 1.30 (1.16-1.47) | 1.07 (0.99-1.15) |
| 1-2a-3a-4a | 279,381 | 1.50 (1.33-1.69) | 1.12 (1.04-1.20) | 1.32 (1.17-1.49) | 1.07 (1.00-1.15) |
| 5 | 476,966 | 1.44 (1.31-1.57) | 1.13 (1.08-1.20) |  |  |
| 1-5 | 476,966 | 1.43 (1.30-1.56) | 1.13 (1.07-1.19) |  |  |
| 2a-5 | 448,222 | 1.44 (1.32-1.57) | 1.14 (1.08-1.20) |  |  |
| 2b-5 | 476,966 | 1.46 (1.34-1.60) | 1.15 (1.09-1.21) |  |  |
| 3a-5 | 476,879 | 1.44 (1.32-1.57) | 1.14 (1.08-1.19) |  |  |
| 3b-5 | 479,966 | 1.44 (1.32-1.57) | 1.14 (1.08-1.20) |  |  |
| 4a-5 | 477,079 | 1.44 (1.32-1.57) | 1.14 (1.08-1.20) |  |  |
| 4b-5 | 476,980 | 1.44 (1.31-1.57) | 1.14 (1.08-1.20) |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **B** |  | **Simple adjustment** | | **Full adjustment** | |
| **Analysis** | **N** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** |
| Default | 316,214 | 1.16 (0.95-1.42) | 1.10 (0.98-1.22) | 1.07 (0.87-1.31) | 1.09 (0.98-1.22) |
| 1 | 316,214 | 1.15 (0.94-1.40) | 1.09 (0.98-1.22) | 1.06 (0.87-1.30) | 1.09 (0.97-1.21) |
| 1-2a | 279,362 | 1.15 (0.94-1.41) | 1.09 (0.98-1.22) | 1.07 (0.87-1.31) | 1.09 (0.97-1.22) |
| 1-2a-3a | 279,343 | 1.17 (0.95-1.43) | 1.09 (0.98-1.22) | 1.08 (0.88-1.33) | 1.09 (0.97-1.22) |
| 1-2a-3a-4a | 279,410 | 1.18 (0.96-1.43) | 1.09 (0.98-1.22) | 1.10 (0.90-1.34) | 1.09 (0.98-1.22) |
| 5 | 476,966 | 1.21 (1.05-1.40) | 1.10 (1.01-1.19) |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **C** |  | **Simple adjustment** | | **Full adjustment** | |
| **Analysis** | **N** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** |
| Default | 316,214 | 1.73 (1.37-2.18) | 1.18 (1.01-1.37) | 1.35 (1.07-1.71) | 1.06 (0.91-1.23) |
| 1 | 316,214 | 1.71 (1.36-2.16) | 1.17 (1.01-1.36) | 1.35 (1.06-1.70) | 1.05 (0.91-1.23) |
| 1-2a | 299,362 | 1.71 (1.36-2.16) | 1.16 (1.00-1.35) | 1.35 (1.06-1.70) | 1.04 (0.90-1.22) |
| 1-2a-3a | 279,351 | 1.71 (1.36-2.17) | 1.16 (1.00-1.35) | 1.35 (1.06-1.71) | 1.05 (0.90-1.22) |
| 1-2a-3a-4a | 279,420 | 1.73 (1.37-2.19) | 1.16 (0.99-1.35) | 1.36 (1.07-1.73) | 1.04 (0.89-1.22) |
| 5 | 476,966 | 1.63 (1.37-1.94) | 1.20 (1.08-1.34) |  |  |

**S7**: Results for analyses predicting dementia as the outcome, with hearing loss as the exposure, expressed as the risk ratio (RR), using logistic regression. The information in the individual tables and columns is analogous to results presented as HRs in **S6**.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **A** |  | **Simple adjustment** | | **Full adjustment** | |
| **Analysis** | **N** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** |
| Default | 316,214 | 1.51 (1.34-1.70) | 1.08 (1.01-1.16) | 1.30 (1.16-1.46) | 1.02 (0.95-1.09) |
| 1 | 316,214 | 1.51 (1.34-1.70) | 1.08 (1.01-1.16) | 1.30 (1.16-1.46) | 1.02 (0.95-1.09) |
| 2a | 295,779 | 1.49 (1.32-1.67) | 1.07 (1.00-1.15) | 1.29 (1.15-1.45) | 1.01 (0.95-1.09) |
| 2b | 316,214 | 1.51 (1.34-1.70) | 1.08 (1.01-1.16) | 1.30 (1.16-1.46) | 1.02 (0.95-1.09) |
| 3a | 316,162 | 1.52 (1.35-1.71) | 1.09 (1.01-1.17) | 1.31 (1.16-1.47) | 1.02 (0.96-1.10) |
| 3b | 316,214 | 1.52 (1.35-1.71) | 1.09 (1.01-1.17) | 1.31 (1.16-1.47) | 1.03 (0.96-1.10) |
| 4a | 316,281 | 1.52 (1.36-1.71) | 1.08 (1.01-1.16) | 1.32 (1.16-1.48) | 1.02 (0.95-1.09) |
| 4b | 316,222 | 1.52 (1.35-1.71) | 1.07 (1.01-1.15) | 1.31 (1.16-1.48) | 1.01 (0.94-1.09) |
| 1-2a | 279,362 | 1.47 (1.31-1.65) | 1.07 (1.00-1.15) | 1.28 (1.14-1.44) | 1.01 (0.94-1.08) |
| 1-2a-3a | 279,315 | 1.48 (1.31-1.66) | 1.07 (1.00-1.15) | 1.29 (1.15-1.45) | 1.01 (0.94-1.09) |
| 1-2a-3a-4a | 279,381 | 1.49 (1.33-1.68) | 1.07 (1.00-1.15) | 1.31 (1.16-1.47) | 1.02 (0.95-1.09) |
| 5 | 476,966 | 1.47 (1.35-1.60) | 1.09 (1.03-1.15) |  |  |
| 1-5 | 476,966 | 1.47 (1.35-1.60) | 1.09 (1.03-1.15) |  |  |
| 2a-5 | 448,222 | 1.45 (1.33-1.58) | 1.08 (1.03-1.14) |  |  |
| 2b-5 | 476,966 | 1.47 (1.35-1.60) | 1.09 (1.03-1.15) |  |  |
| 3a-5 | 476,879 | 1.47 (1.35-1.61) | 1.09 (1.04-1.15) |  |  |
| 3b-5 | 476,966 | 1.47 (1.35-1.61) | 1.09 (1.04-1.15) |  |  |
| 4a-5 | 477,079 | 1.47 (1.35-1.61) | 1.09 (1.03-1.15) |  |  |
| 4b-5 | 476,980 | 1.47 (1.35-1.61) | 1.09 (1.04-1.15) |  |  |

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| --- | --- | --- | --- | --- | --- |
| **B** |  | **Simple adjustment** | | **Full adjustment** | |
| **Analysis** | **N** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** |
| Default | 316,214 | 1.17 (0.96-1.43) | 1.06 (0.96-1.18) | 1.06 (0.87-1.30) | 1.04 (0.93-1.16) |
| 1 | 316,214 | 1.17 (0.96-1.43) | 1.06 (0.95-1.18) | 1.06 (0.87-1.30) | 1.04 (0.93-1.16) |
| 1-2a | 279,362 | 1.15 (0.94-1.40) | 1.04 (0.93-1.16) | 1.05 (0.86-1.28) | 1.03 (0.92-1.15) |
| 1-2a-3a | 279,343 | 1.16 (0.95-1.42) | 1.05 (0.94-1.17) | 1.06 (0.87-1.30) | 1.03 (0.92-1.15) |
| 1-2a-3a-4a | 279,410 | 1.17 (0.96-1.42) | 1.05 (0.94-1.17) | 1.08 (0.88-1.31) | 1.03 (0.92-1.15) |
| 5 | 476,966 | 1.24 (1.08-1.43) | 1.05 (0.97-1.14) |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **C** |  | **Simple adjustment** | | **Full adjustment** | |
| **Analysis** | **N** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** | **Hearing aid (95% CI)** | **No hearing aid (95% CI)** |
| 1 | 316,214 | 1.75 (1.39-2.20) | 1.14 (0.98-1.32) | 1.35 (1.07-1.70) | 1.01 (0.87-1.17) |
| 1-2a | 279,362 | 1.70 (1.35-2.14) | 1.11 (0.96-1.29) | 1.33 (1.05-1.68) | 0.99 (0.85-1.15) |
| 1-2a-3a | 279,351 | 1.70 (1.35-2.15) | 1.12 (0.96-1.30) | 1.33 (1.05-1.68) | 0.99 (0.85-1.15) |
| 1-2a-3a-4a | 279,420 | 1.72 (1.36-2.17) | 1.11 (0.96-1.29) | 1.34 (1.06-1.70) | 0.99 (0.85-1.15) |
| 5 | 476,966 | 1.67 (1.40-1.98) | 1.15 (1.03-1.28) |  |  |

**Supplementary references**

1. Jiang F, Mishra SR, Shrestha N, et al. Association between hearing aid use and all-cause and cause-specific dementia: an analysis of the UK Biobank cohort. *Lancet Public Health* 2023.
2. Stevenson JS, Clifton L, Kuzma E, Littlejohns TJ. Speech-in-noise hearing impairment is associated with an increased risk of incident dementia in 82,039 UK Biobank participants. *Alzheimers Dement* 2022; **18**(3): 445-56.

1. Jiang et al. combined the two highest income categories (“£52,000-£100,000” and “>£100,000”). [↑](#footnote-ref-1)
2. When using algorithmically-defined outcomes for ascertainment of dementia as per the default analysis as presented in **S5**. [↑](#footnote-ref-2)