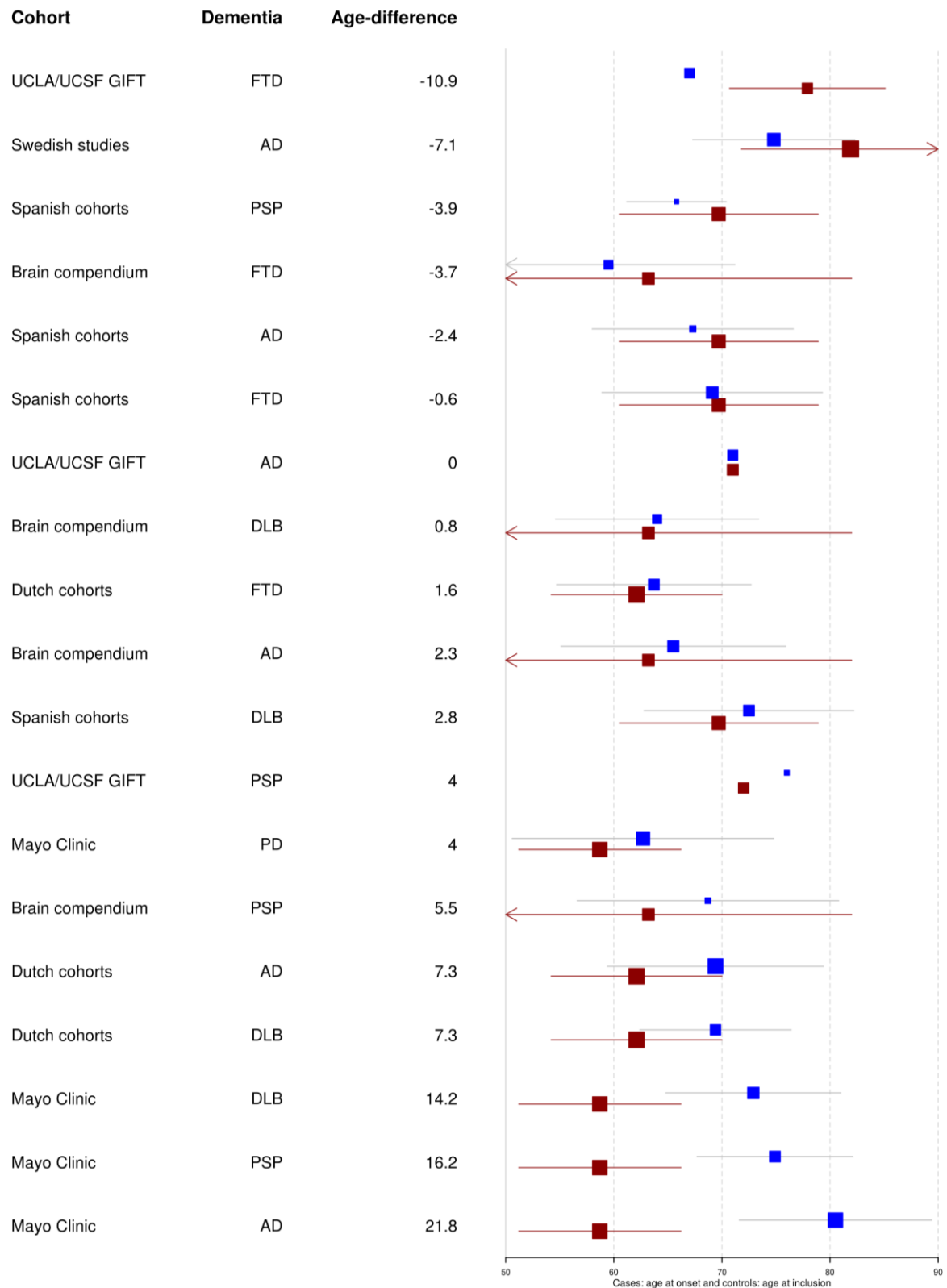
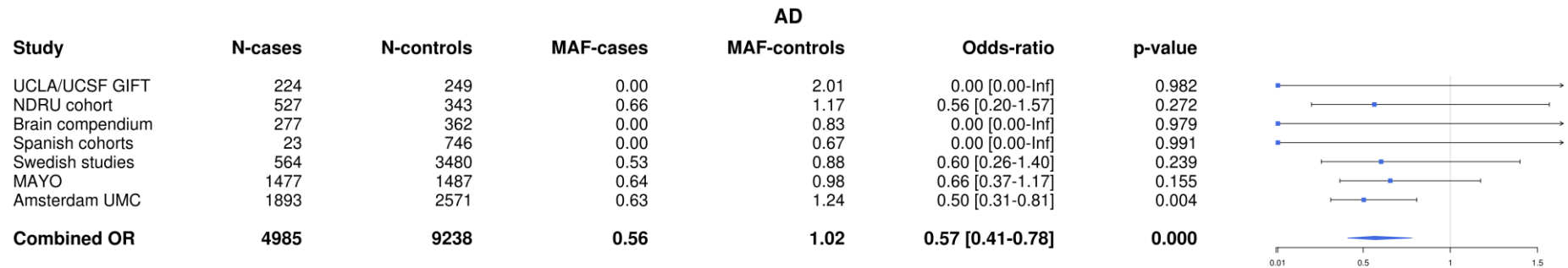


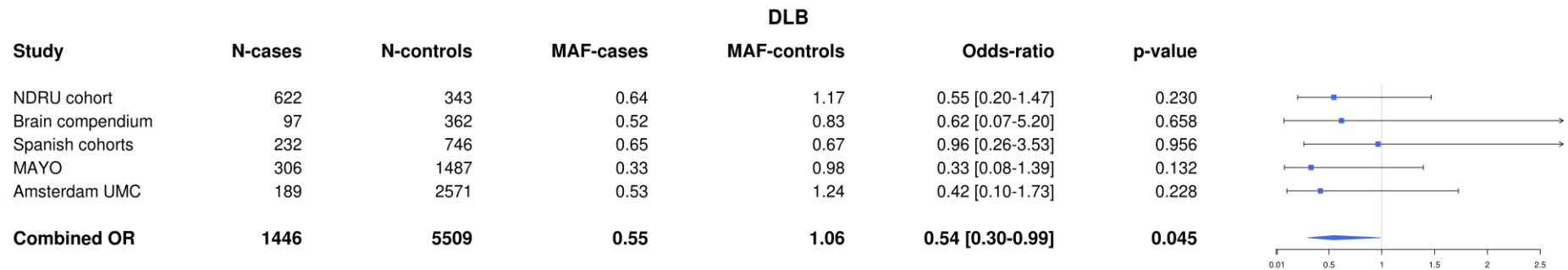
## Content: Supplementary Figures 1-10



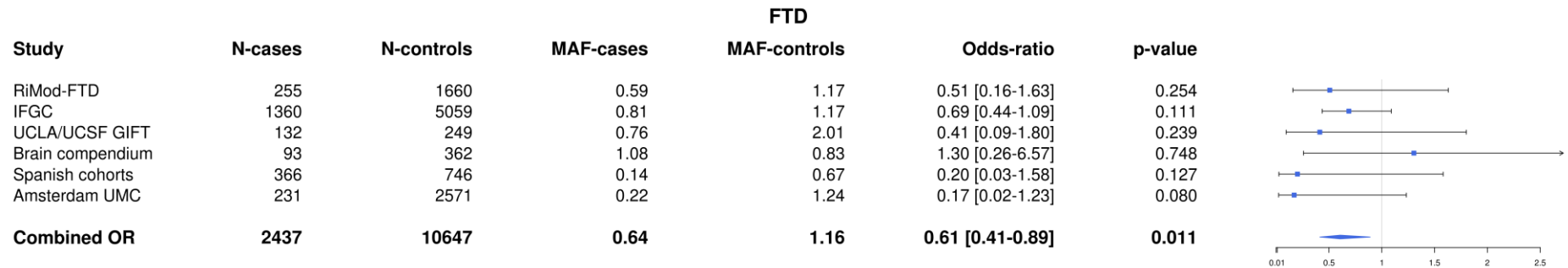
**Supplementary Figure 1:** Average age of cases (blue) and controls (red) in cohorts. Whiskers show the standard deviation of the average age. Cohorts are ordered by the difference in age between cases and controls. Most cohort have controls of the same age or lower than the cases.



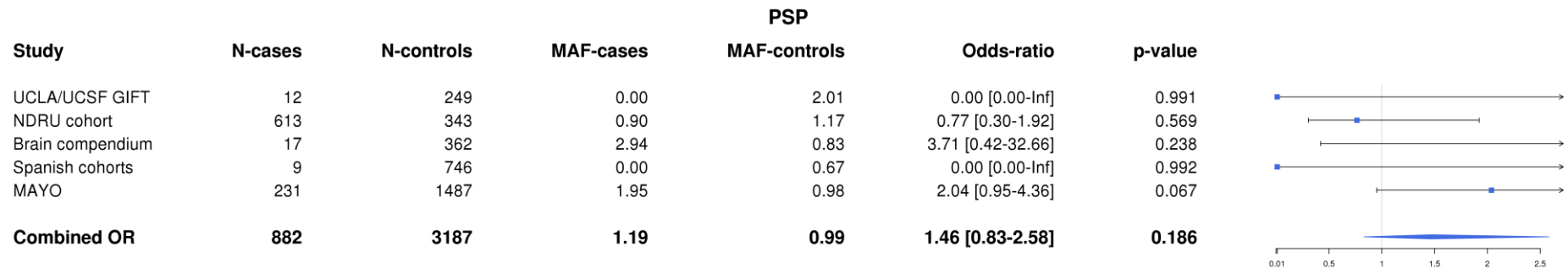
**Supplementary Figure 2:** Alzheimer's Disease (AD) cohort-specific associations of rs72824905-G. Numbers (N) of AD patients and controls studied. MAF = minor allele frequency. The figure shows the odds-ratio (box) of the rs72824905-G with the 95% confidence intervals (whiskers) per study. The combined OR and 95% confidence interval is shown as a triangle.



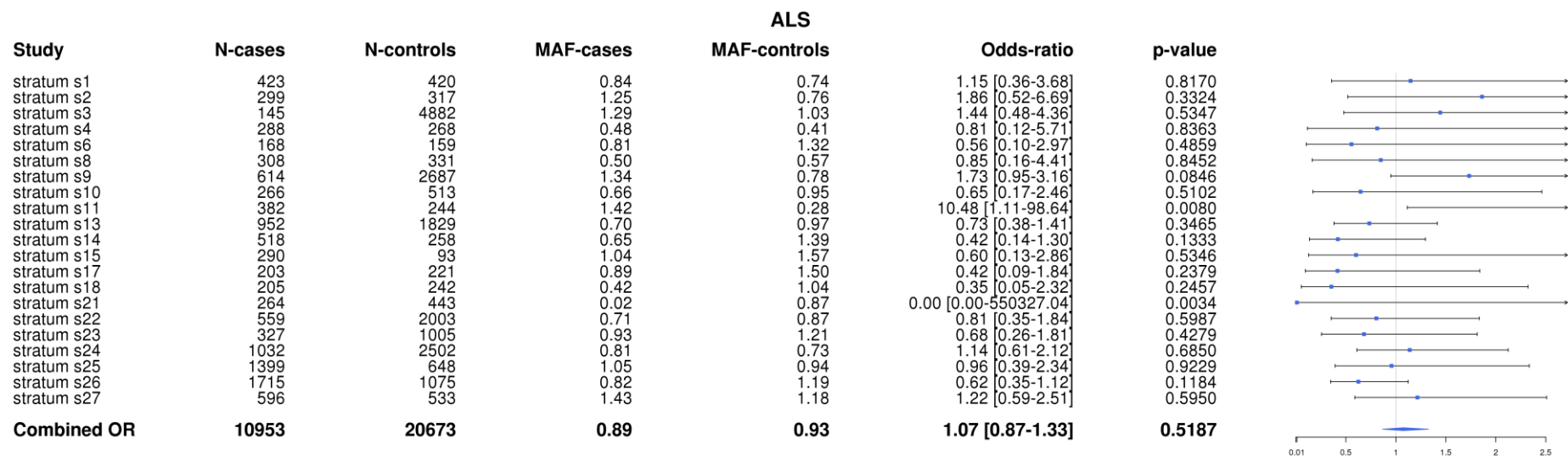
**Supplementary Figure 3:** Dementia with Lewy-bodies (DLB) cohort-specific associations of rs72824905-G. Numbers (N) of DLB patients and controls studied. MAF = minor allele frequency. The figure shows the odds-ratio (box) of the rs72824905-G with the 95% confidence intervals (whiskers) per study. The combined OR and 95% confidence interval is shown as a triangle.



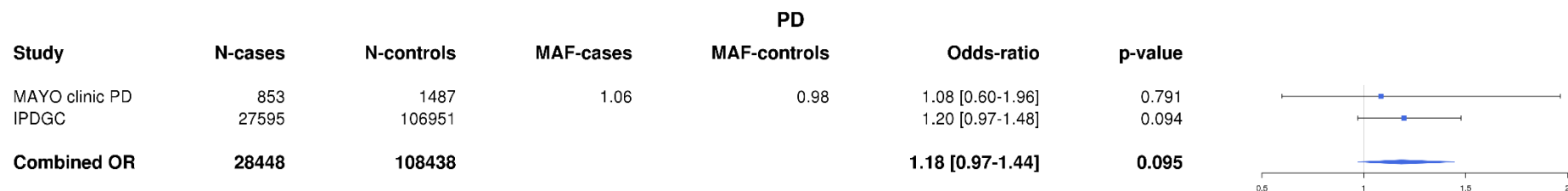
**Supplementary Figure 4:** Frontal Temporal Dementia (FTD) cohort-specific associations of rs72824905-G. Numbers (N) of FTD patients and controls studied. MAF = minor allele frequency. The figure shows the odds-ratio (box) of the rs72824905-G with the 95% confidence intervals (whiskers) per study. The combined OR and 95% confidence interval is shown as a triangle.



**Supplementary Figure 5:** Progressive Supranuclear Palsy (PSP) cohort-specific associations of rs72824905-G. Numbers (N) of PSP patients and controls studied. MAF = minor allele frequency. The figure shows the odds-ratio (box) of the rs72824905-G with the 95% confidence intervals (whiskers) per study. The combined OR and 95% confidence interval is shown as a triangle.

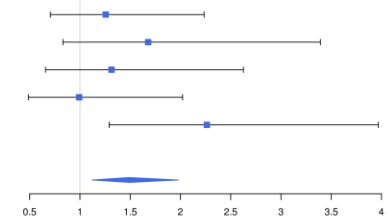


**Supplementary Figure 6:** Amyotrophic Lateral Sclerosis (ALS) cohort-specific associations of rs72824905-G. Numbers (N) of ALS patients and controls studied. MAF = minor allele frequency. The figure shows the odds-ratio (box) of the rs72824905-G with the 95% confidence intervals (whiskers) per study. The combined OR and 95% confidence interval is shown as a triangle.

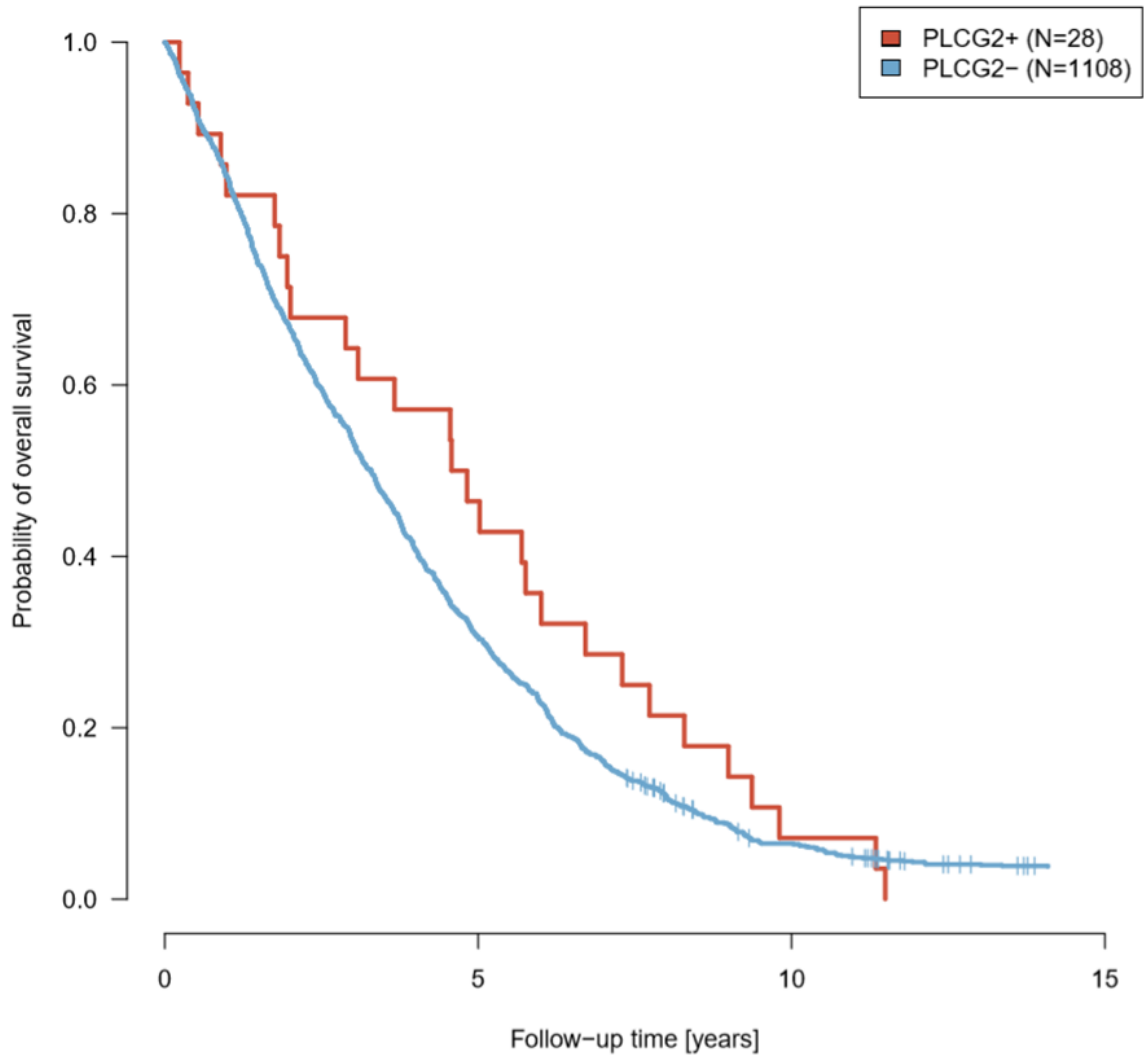


**Supplementary Figure 7:** Parkinson’s Disease (PD) cohort-specific associations of rs72824905-G. Numbers (N) of PD patients and controls studied. MAF = minor allele frequency. The figure shows the odds-ratio (box) of the rs72824905-G with the 95% confidence intervals (whiskers) per study. The combined OR and 95% confidence interval is shown as a triangle.

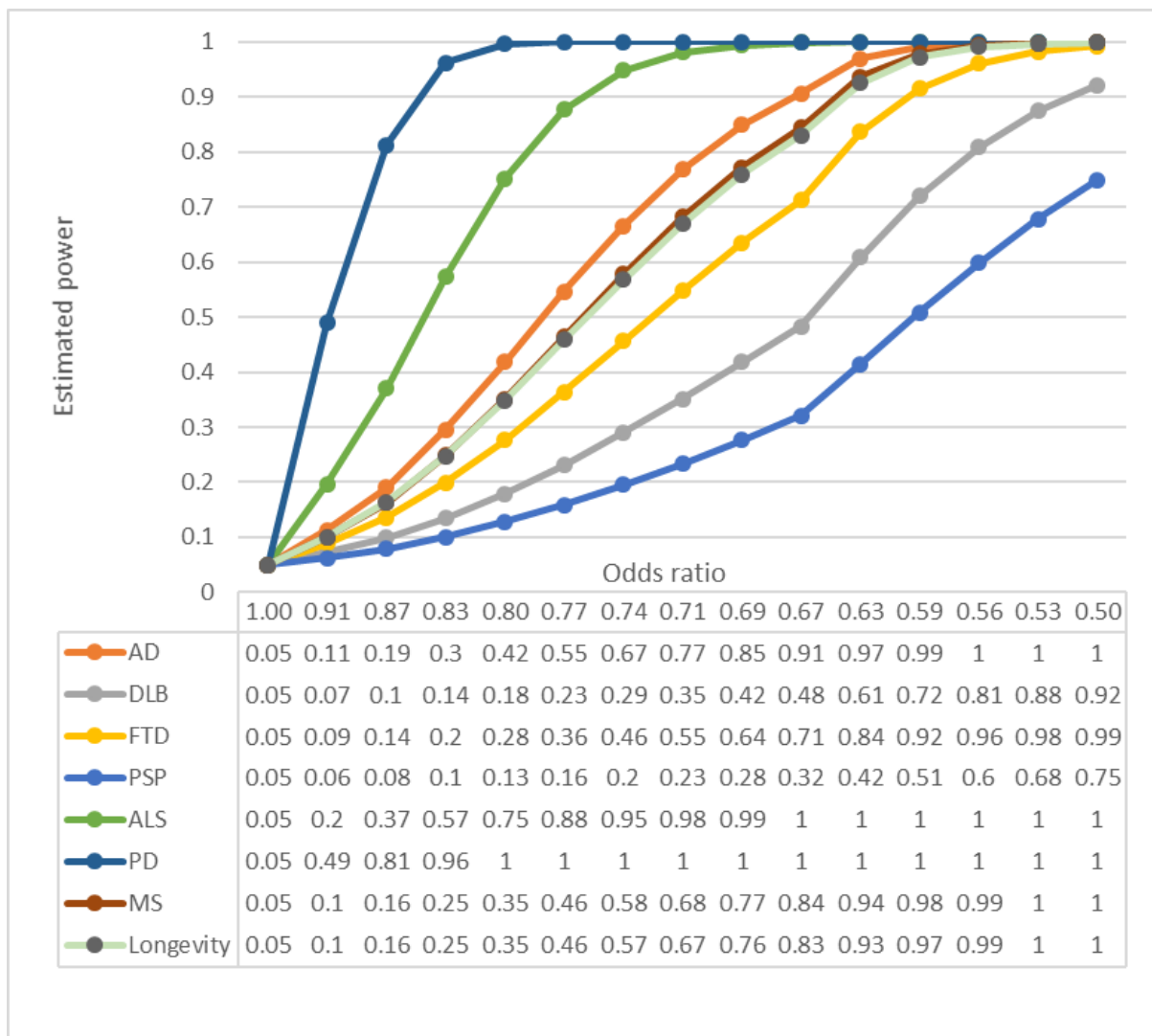
Study	N-cases	N-controls	Longevity		Odds-ratio	p-value
			MAF-cases	MAF-controls		
GBC	770	2709	1.04	0.83	1.26 [0.71-2.24]	0.438
LLS	1138	743	1.23	0.74	1.68 [0.83-3.39]	0.149
AgeCoDe	462	861	1.52	1.16	1.31 [0.66-2.63]	0.440
Danish studies	853	2793	0.59	0.59	0.99 [0.49-2.02]	0.983
Amsterdam UMC	293	2571	2.73	1.24	2.26 [1.29-3.97]	0.004
<b>Combined OR</b>	<b>3516</b>	<b>9677</b>	<b>1.19</b>	<b>0.89</b>	<b>1.49 [1.12-1.98]</b>	<b>0.006</b>



**Supplementary Figure 8:** Longevity cohort-specific associations of rs72824905-G. Numbers (N) of long-lived individuals and controls studied. MAF = minor allele frequency. The figure shows the odds-ratio (box) of the rs72824905-G with the 95% confidence intervals (whiskers) per study. The combined OR and 95% confidence interval is shown as a triangle.



**Supplementary Figure 9:** Survival after the age of 90 years of rs72824905-G carriers vs. non-carriers. A Kaplan-Meier curves are shown. Whiskers show individuals that were censored.



**Supplementary figure 10:** Power analysis for Alzheimer’s disease (AD), Frontotemporal Dementia (FTD), dementia with Lewy-bodies (DLB), Progressive Supranuclear Palsy (PSP), Parkinson’s Disease (PD) Amyotrophic Lateral Sclerosis (ALS) and Multiple Sclerosis (MS). Statistical power of our analysis to attain a  $p$ -value of 0.05 is shown for the odds ratios (ORs) between 0.50 and 1. We used the total number of cases and controls from our analysis. We assumed an additive model, a minor allele frequency of 0.009 and a disease frequency of 0.01 for all diseases. The table shows the exact estimates of statistical power.