

## **Supplementary Material – Jonkman et al.**

### ***Predicting trajectories of functional decline in 60-70 year old people***

**Supplementary Table 1:** Baseline characteristics for InCHIANTI and LASA cohorts for young older males and females.

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**References Supplementary Material**

**Supplementary Table 1:** Baseline characteristics for InCHIANTI and LASA cohorts for young older males and females.

Variable	MALES			FEMALES		
	InCHIANTI n=183	LASA n=186	p-value <sup>a</sup>	InCHIANTI n=220	LASA n=209	p-value <sup>a</sup>
<b><i>Socio-demographic variables</i></b>						
Age, yrs	66.9±2.3	67.9±1.7	<0.001	67.0±2.4	68.0±1.7	<0.001
Not married	39 (21.3%)	30 (16.1%)	0.202	50 (22.7%)	90 (43.1%)	<0.001
Living alone	22 (12.0%)	21 (11.3%)	0.827	23 (10.5%)	82 (39.2%)	<0.001
Retired	168 (91.8%)	156 (83.9%)	0.020	205 (93.2%)	197 (95.2%)	0.382
<8 years education	135 (73.8%)	46 (24.7%)	<0.001	172 (78.2%)	105 (50.2%)	<0.001
Economic satisfaction						
Sufficient	95 (52.8%)	41 (22.3%)	<0.001	121 (56.3%)	55 (26.6%)	<0.001
Bad	11 (6.1%)	13 (7.1%)		18 (8.4%)	17 (8.2%)	
<b><i>Performance related variables</i></b>						
Unable to perform tandem stand for 10s	7 (4.1%)	27 (14.7%)	0.001	23 (11.4%)	52 (25.2%)	<0.001
Chair stands, s	9 (8-11)	11 (10-13)	<0.001	10 (9-12)	12 (10-13)	<0.001
Gait speed, m/s	1.57±0.26	0.96±0.26	<0.001	1.27±0.25	0.88±0.24	<0.001
Handgrip strength, kg	44.0±9.2	41.9±7.4	0.030	25.3±6.9	25.1±4.7	0.740
≥1 fall within last 12 months	16 (8.7%)	55 (29.6%)	0.001	53 (24.1%)	63 (30.1%)	0.205
Fear of falling	33 (18.0%)	16 (8.6%)	0.008	44 (20.0%)	53 (25.4%)	0.185
<b><i>Lifestyle variables</i></b>						
Physical activity						
Moderate level	64 (35.2%)	62 (33.7%)	<0.001	119 (54.1%)	51 (24.6%)	<0.001
Low level	7 (3.8%)	61 (33.2%)		26 (11.8%)	45 (21.7%)	
Smoking behavior						
Former smoker	52 (28.4%)	125(67.2%)	<0.001	58 (26.4%)	67 (32.1%)	0.414
Current smoker	31 (16.9%)	41 (22.0%)		41 (18.6%)	38 (18.2%)	
≥1 glasses alcohol/week	136 (74.3%)	166 (89.2%)	<0.001	172 (78.2%)	162 (77.5%)	0.014
<b><i>Clinical variables</i></b>						
BMI			<0.001			
25-29.99	98 (55.4%)	94 (50.5%)		96 (46.8%)	80 (38.6%)	0.137
≥30	47 (26.6%)	27 (14.5%)		54 (26.3%)	54 (26.1%)	
Waist circumference	36 (20.7%)	82 (44.6%)	<0.001	146 (73.0%)	108 (54.5%)	<0.001
≥102 cm in men/ ≥88 cm in women						
Blood pressure, mmHG	114.0±13.1	115.9±16.1	0.203	115.4±12.8	112.8±15.9	0.660
Self-reported chronic diseases						
Cardiovascular	23 (12.6%)	45 (24.2%)	0.004	27 (12.3%)	33 (15.8%)	0.294
Peripheral artery	19 (10.4%)	17 (9.1%)	0.687	19 (8.6%)	14 (6.7%)	0.452
Diabetes mellitus	22 (12.0%)	10 (5.4%)	0.023	24 (10.9%)	11 (5.3%)	0.033
Stroke	8 (4.4%)	7 (3.8%)	0.767	9 (4.1%)	4 (1.9%)	0.189
COPD	21 (11.5%)	23 (12.4%)	0.792	17 (7.7%)	19 (9.1%)	0.611
Arthritis	21 (11.5%)	54 (29.0%)	<0.001	30 (13.6%)	111 (53.1%)	<0.001
Cancer	8 (4.4%)	13 (7.0%)	0.278	16 (7.3%)	35 (16.7%)	0.002
≥3 medications	47 (25.7%)	46 (24.7%)	0.833	50 (22.7%)	52 (24.9%)	0.601
Cognitive functioning MMSE score	27 (25-28)	28 (27-29)	<0.001	27 (25-28)	28 (27-29)	<0.001
Depressive symptoms present (>16 CES-D)	34 (18.6%)	9 (4.9%)	<0.001	40 (18.2%)	32 (15.5%)	0.453

Notes: Data are presented as mean ± SD, n (%), or median (IQR).

<sup>a</sup> Tested with independent samples t-test for continuous data and Chi-square test for categorical data.

**Supplementary Table 2:** Overview of assessment of all variables in InCHIANTI and LASA cohorts and harmonization of variables.

Variable	InCHIANTI	LASA	Harmonized variable
<b>Outcome</b>			
<i>Functional decline</i>	14 self-reported items on the difficulty with ADL or iADL activities, scored 0 - no difficulty 1 - with difficulty, but without help 2 - only with help 3 - unable to do	6 self-reported items on the difficulty with ADL or iADL activities, scored: 0 - no difficulty 1 - with some difficulty 2 - with much difficulty, but without help 3 - only with help 4 - unable to do	6 overlapping items scored: 0 - no difficulty 1 - with difficulty, but without help 2 - only with help 3 - unable to do  Total score = sum score of 6 items (0-18)
	Selection of 6 overlapping items: • dressing and undressing • sitting down, standing up in bed • using own or public transportation • walking up and down a staircase of 10 steps without resting • walking outside for 400 meters • cutting own toenails	Selection of 6 overlapping items: • dressing and undressing • sitting down, standing up a chair • using own or public transportation • walking up and down a staircase of 15 steps without resting • walking outside during 5 minutes without stopping • cutting own toenails	
<b>Socio-demographic variables</b>			
<i>Sex</i>	Derived from population registry	Derived from population registry	Binary variable: • male • female
<i>Age</i>	Derived from population registry	Derived from population registry	Years of age
<i>Marital status</i>	Categorized: • married • divorced • widowed • not married	Categorized: • married • divorced • widowed • never married	Categorized: • married • not married/ divorced/ widowed
<i>Living status</i>	Categorized: • not living alone • living alone	Number of people living in household	Categorized: • not living alone • living alone
<i>Occupational status</i>	Categorized: • currently employed • retired/not working	Categorized: • paid job at present • retired • disability pension • unemployed	Categorized: • currently employed • retired/not working
<i>Level of education</i>	Number of years of education completed	Categorized, categories converted to number of years of education completed: • elementary education not completed (5 yrs) • elementary education (6 yrs) • lower vocational education (9 yrs) • general intermediate education (10 yrs) • intermediate vocational education (11 yrs) • general secondary education (12 yrs) • high vocational education (15 yrs) • college education (16 yrs) • university (18 yrs)	Categorized: • ≥8 years education • <8 years education
<i>Economic satisfaction</i>	Categorized: • good • sufficient • bad • don't know	Categorized: • satisfied • a little satisfied • not satisfied/dissatisfied • a little dissatisfied • dissatisfied	Categorized: • good • sufficient • bad
<b>Physical performance variables</b>			

<b>Variable</b>	<b>InCHIANTI</b>	<b>LASA</b>	<b>Harmonized variable</b>
<i>Balance</i>	Time able to perform a tandem stand, in s (max. 10 s)	Time able to perform a tandem stand, in s (max. 10 s)	Categorized: <ul style="list-style-type: none"> <li>• able to perform 10 s</li> <li>• not able to perform 10 s</li> </ul>
<i>Chair stands</i>	Time to perform 5 repeated chair stands as quickly as possible, in s	Time to perform 5 repeated chair stands as quickly as possible, in s	Time in s
<i>Gait speed</i>	Gait speed for walking 7 m as quickly as possible, in m/s	Gait speed for walking 3+3 m as quickly as possible, in m/s	Z-score of gait speed in m/s by subtracting mean, then dividing by SD
<i>Handgrip strength</i>	2 measurements of both hands, in kg, using a dynamometer (Takei TKK 5001, Takei Scientific Instruments Co. Ltd., Tokyo, Japan)	2 measurements of both hands, in kg, using a dynamometer (Takei TKK 5001, Takei Scientific Instruments Co. Ltd., Tokyo, Japan)	Maximum score of 1 of both hands, in kg
<i>Fall history</i>	Self-reported falls in the last 12 months	Self-reported falls in the last 12 months	Number of falls in last year, categorized: <ul style="list-style-type: none"> <li>• no falls</li> <li>• <math>\geq 1</math> falls</li> </ul>
<i>Fear of falling</i>	SAFE scale containing 11 self-reported items, scored: 0 – no fear 1 – does not do the activity due to fear of falling  Selection of 5 overlapping items: <ul style="list-style-type: none"> <li>• preparation of simple meals</li> <li>• taking a bath</li> <li>• do some shopping</li> <li>• a small walk in the neighborhood</li> <li>• picking something from a deep or low cupboard</li> </ul> Total score = sum score of 5 items (0-5)	FES scale containing 10 self-reported items, scored: 0 – not concerned 1 – a little concerned 2 – fairly concerned 3 – very concerned 0 – does not/cannot do  Selection of 5 overlapping items: <ul style="list-style-type: none"> <li>• preparation of simple meals</li> <li>• taking a bath</li> <li>• do some shopping</li> <li>• a small walk in the neighborhood</li> <li>• picking something from a deep or low cupboard</li> </ul> Total score = sum score of 5 items (0-15)	Categorized: <ul style="list-style-type: none"> <li>• no fear of falling (score = 0)</li> <li>• some fear of falling (score <math>\geq 1</math>)</li> </ul>
<b><i>Lifestyle variables</i></b>			
<i>Physical activity</i>	Weekly intensity categorized: <ul style="list-style-type: none"> <li>• Hardly any physical activity (low)</li> <li>• Mostly sitting/some walking (low)</li> <li>• Light exercise 2-4 hrs/week (moderate)</li> <li>• Moderate 1-2 hrs or light &gt;4 hrs/wk (moderate)</li> <li>• Moderate exercise &gt;3 hrs/wk</li> <li>• Intense exercise many times/wk</li> </ul>	LAPAQ questionnaire for measuring time spent last two weeks on bicycling, walking outdoors, and doing sports.	InCHIANTI participants were categorized in three levels: <ul style="list-style-type: none"> <li>• high level (intense/moderate exercise &gt;3hrs/wk)</li> <li>• moderate level (light/moderate exercise 1-2 hrs/wk)</li> <li>• low level (hardly any activity/some walking)</li> </ul> LASA participants were categorized based on sex-specific tertiles: <ul style="list-style-type: none"> <li>• high level (highest tertile)</li> <li>• moderate level (medium tertile)</li> <li>• low level (lowest tertile)</li> </ul>
<i>Smoking behaviour</i>	Categorized: <ul style="list-style-type: none"> <li>• never smoker</li> <li>• former smoker</li> <li>• current smoker</li> </ul>	Categorized: <ul style="list-style-type: none"> <li>• never smoker</li> <li>• former smoker</li> <li>• current smoker</li> </ul>	Categorized: <ul style="list-style-type: none"> <li>• never smoker</li> <li>• former smoker</li> <li>• current smoker</li> </ul>
<i>Alcohol intake</i>	Number of alcoholic units per week, specified by type of drink (i.e., wine, beer, spirits)	Number of alcoholic drinks per week	Number of alcoholic glasses per week, categorized: <ul style="list-style-type: none"> <li>• none</li> <li>• <math>\geq 1</math> glasses</li> </ul>
<b><i>Clinical variables</i></b>			
<i>BMI</i>	Measured weight (in kg) divided by measured length (in squared m)	Measured weight (in kg) divided by measured length (in squared m)	kg/m <sup>2</sup> , categorized: <ul style="list-style-type: none"> <li>• normal (&lt;25)</li> <li>• overweight (25-29.99)</li> <li>• obese (<math>\geq 30</math>)</li> </ul>

<b>Variable</b>	<b>InCHIANTI</b>	<b>LASA</b>	<b>Harmonized variable</b>
<i>Waist circumference</i>	Measured in cm	Mean of 2 measurements, in cm	cm, categorized: <ul style="list-style-type: none"> <li>• no increased risk (&lt;94 cm in men, &lt;80 cm in women)</li> <li>• increased risk (94-101 cm in men, 80-88 cm in women)</li> <li>• substantially increased risk (102 cm or higher in men, 88 cm or higher in women)</li> </ul>
<i>Blood pressure</i>	Diastolic and systolic blood pressure, measured at the arm during a sitting position, in mmHG	Mean diastolic and mean systolic blood pressure of 2 measurements, measured at the arm during a sitting position, in mmHG	Mean of diastolic and systolic blood pressure, in mmHg
<i>Self-reported chronic diseases</i>	Self-reported chronic diseases, no pre-specified categories.	Self-reported chronic diseases in categories: <ul style="list-style-type: none"> <li>• cardiovascular disease</li> <li>• peripheral artery disease</li> <li>• diabetes mellitus</li> <li>• chronic non-specific lung disease</li> <li>• stroke</li> <li>• rheumatoid arthritis</li> <li>• osteoarthritis</li> <li>• malignant neoplasms</li> </ul>	Chronic diseases, categorized: <ul style="list-style-type: none"> <li>• cardiovascular disease</li> <li>• peripheral artery disease</li> <li>• diabetes mellitus</li> <li>• chronic non-specific lung disease</li> <li>• stroke</li> <li>• rheumatoid/osteoarthritis</li> <li>• cancer</li> </ul>
<i>Medication use</i>	Self-reported number of medications	Self-reported number of medications	Number of medications, categorized: <ul style="list-style-type: none"> <li>• &lt;3 medications</li> <li>• ≥3 medications</li> </ul>
<i>Cognitive functioning</i>	MMSE scale	MMSE scale	MMSE score (1-30)
<i>Depressive symptoms</i>	CES-D scale	CES-D scale	CES-D score (0-60), categorized: <ul style="list-style-type: none"> <li>• no depressive symptoms</li> <li>• depressive symptoms (&gt;16)</li> </ul>

*Notes:* ADL=activities of daily living; CES-D=Center for Epidemiologic Studies-Depression(1); FES= Falls Efficacy Scale(2); iADL=instrumental activities of daily living; LAPAQ=LASA Physical Activity Questionnaire(3, 4); MMSE=Mini-Mental State Examination(5); SAFE=Survey of Activities and Fear of falling in the Elderly(6); SD=standard deviation.

**Supplementary Table 3:** Univariate odds ratios for distinct trajectories of functional decline in young older males and females.

Variable	MALES		FEMALES	
	Univariate OR (95% CI)		Univariate OR (95% CI)	
	Intermediate vs. no/little decline	Severe vs.no/little decline	Intermediate vs. no/little decline	Severe vs.no/little decline
<i>Socio-demographic variables</i>				
Age, yrs	<b>1.15 (1.01-1.30)</b>	<b>1.06 (0.88-1.28)</b>	<b>1.21 (1.09-1.34)</b>	<b>1.50 (1.18-1.90)</b>
Not married	0.97 (0.53-1.80)	1.86 (0.82-4.20)	<b>1.48 (0.94-2.32)<sup>a</sup></b>	<b>0.77 (0.33-1.80)<sup>a</sup></b>
Living alone	1.07 (0.52-2.23)	1.66 (0.62-4.43)	<b>1.77 (1.05-2.97)</b>	<b>0.74 (0.29-1.87)</b>
Retired	1.16 (0.58-2.31)	2.95 (0.66-13.11)	1.03 (0.42-2.52)	0.44 (0.12-1.67)
<8 years education	<b>2.06 (1.17-3.62)</b>	<b>2.68 (1.15-6.23)</b>	0.89 (0.56-1.40)	1.80 (0.77-4.21)
Economic satisfaction				
Good	1.0	1.0	1.0	1.0
Sufficient	<b>1.68 (0.98-2.87)</b>	<b>2.85 (1.28-6.36)</b>	<b>0.90 (0.56-1.44)</b>	<b>0.60 (0.24-1.52)</b>
Bad	<b>0.80 (0.29-2.19)</b>	<b>1.06 (0.22-5.16)</b>	<b>1.08 (0.62-1.87)</b>	<b>0.78 (0.27-2.23)</b>
<i>Physical performance-related variables</i>				
Unable to perform tandem stand for 10s	<b>1.78 (0.79-4.00)</b>	<b>3.48 (1.24-9.78)</b>	<b>2.20 (1.24-3.89)</b>	<b>6.13 (2.52-14.88)</b>
Chair stands, s	<b>1.15 (1.05-1.26)<sup>a</sup></b>	<b>1.26 (1.12-1.42)<sup>a</sup></b>	<b>1.24 (1.14-1.36)<sup>a</sup></b>	<b>1.47 (1.30-1.66)<sup>a</sup></b>
Gait speed, Z-score <sup>b</sup>	<b>0.72 (0.56-0.93)</b>	<b>0.35 (0.23-0.54)</b>	<b>0.49 (0.38-0.63)</b>	<b>0.19 (0.11-0.33)</b>
Handgrip strength, kg	<b>0.99 (0.96-1.02)</b>	<b>0.92 (0.88-0.96)</b>	<b>0.97 (0.93-1.00)</b>	<b>0.88 (0.81-0.95)</b>
≥1 fall within last 12 months	2.78 (1.59-4.88)	1.87 (0.78-4.50)	0.74 (0.46-1.17)	1.44 (0.65-3.19)
Fear of falling	<b>1.32 (0.63-2.76)</b>	<b>5.27 (2.24-12.42)</b>	<b>1.61 (0.97-2.66)</b>	<b>4.39 (1.99-9.71)</b>
<i>Lifestyle variables</i>				
Physical activity				
High level	1.0	1.0	1.0	1.0
Moderate level	<b>0.96 (0.56-1.64)</b>	<b>3.39 (1.32-8.69)</b>	<b>1.06 (0.67-1.68)</b>	<b>3.42 (1.33-8.83)</b>
Low level	<b>1.65 (0.84-3.24)</b>	<b>6.38 (2.10-19.41)</b>	<b>2.35 (1.04-5.29)</b>	<b>9.44 (2.76-32.24)</b>
Smoking behavior				
Never smoker	1.0	1.0	1.0	1.0
Former smoker	0.93 (0.50-1.72)	0.61 (0.24-1.52)	<b>1.81 (1.09-3.01)</b>	<b>2.70 (0.69-10.56)</b>
Current smoker	0.97 (0.48-1.95)	0.44 (0.14-1.43)	<b>2.41 (1.34-4.31)</b>	<b>12.59 (3.50-45.24)</b>
≥1 glasses alcohol/ week	<b>1.40 (0.72-2.74)</b>	<b>0.50 (0.22-1.16)</b>	<b>1.37 (0.82-2.28)</b>	<b>0.60 (0.26-1.36)</b>
<i>Clinical variables</i>				
BMI				
<25	1.0	1.0	1.0	1.0
25-29.99	1.12 (0.65-1.94)	1.85 (0.69-5.00)	<b>1.08 (0.51-2.27)</b>	<b>0.27 (0.02-3.09)</b>
≥30	1.09 (0.53-2.21)	3.41 (1.13-10.31)	<b>1.36 (0.70-2.65)</b>	<b>3.76 (0.84-16.82)</b>
Waist circumference	1.17 (0.71-1.94)	1.42 (0.66-3.07)	<b>1.21 (0.76-1.91)*</b>	<b>6.81 (1.97-23.52)*</b>
≥102 cm in men/ ≥88 cm in women				
Blood pressure, mmHG	1.00 (0.98-1.02)	1.00 (0.98-1.03)	1.01 (0.99-1.02)	1.02 (0.99-1.04)
Self-reported chronic diseases				
Cardiovascular	<b>1.86 (1.03-3.37)</b>	<b>2.58 (1.13-5.86)</b>	<b>1.29 (0.70-2.38)</b>	<b>3.66 (1.55-8.65)</b>
Peripheral artery	1.42 (0.66-3.05)	1.37 (0.43-4.34)	<b>3.16 (1.36-7.33)</b>	<b>6.74 (2.18-20.80)</b>
Diabetes mellitus	1.58 (0.70-3.60)	1.81 (0.56-5.84)	<b>0.76 (0.34-1.69)</b>	<b>3.91 (1.36-11.24)</b>
Stroke	1.27 (0.40-4.08)	1.62 (0.33-8.06)	<b>3.13 (0.78-12.49)</b>	<b>10.61 (1.97-57.26)</b>
COPD	1.49 (0.75-2.96)	1.06 (0.34-3.30)	1.32 (0.62-2.81)	2.57 (0.87-7.60)
Arthritis	<b>1.51 (0.85-2.69)</b>	<b>2.32 (1.04-5.19)</b>	<b>2.06 (1.24-3.43)</b>	<b>2.22 (0.96-5.18)</b>
Cancer	0.95 (0.33-2.69)	2.17 (0.64-7.32)	1.56 (0.81-2.98)	1.87 (0.69-5.08)
≥3 medications	<b>1.05 (0.61-1.80)</b>	<b>2.40 (1.15-5.03)</b>	<b>1.81 (1.10-2.96)</b>	<b>6.09 (2.74-13.55)</b>
Cognitive functioning, MMSE score	0.99 (0.88-1.10)	0.91 (0.78-1.06)	<b>0.96 (0.88-1.05)</b>	<b>0.85 (0.72-0.99)</b>
Depressive symptoms present (>16 CES-D)	<b>0.92 (0.40-2.11)</b>	<b>3.81 (1.50-9.67)</b>	<b>1.64 (0.96-2.80)</b>	<b>1.03 (0.34-3.16)</b>

Notes: CES-D=Center for Epidemiologic Studies-Depression; CI=confidence interval; COPD=chronic obstructive pulmonary disease; MMSE=Mini-Mental State Examination; OR=odds ratio. Bold variables had a *p* value likelihood ratio test <0.20 and were included in the multivariable model.

<sup>a</sup> Variable not included in multivariable model due to multicollinearity.

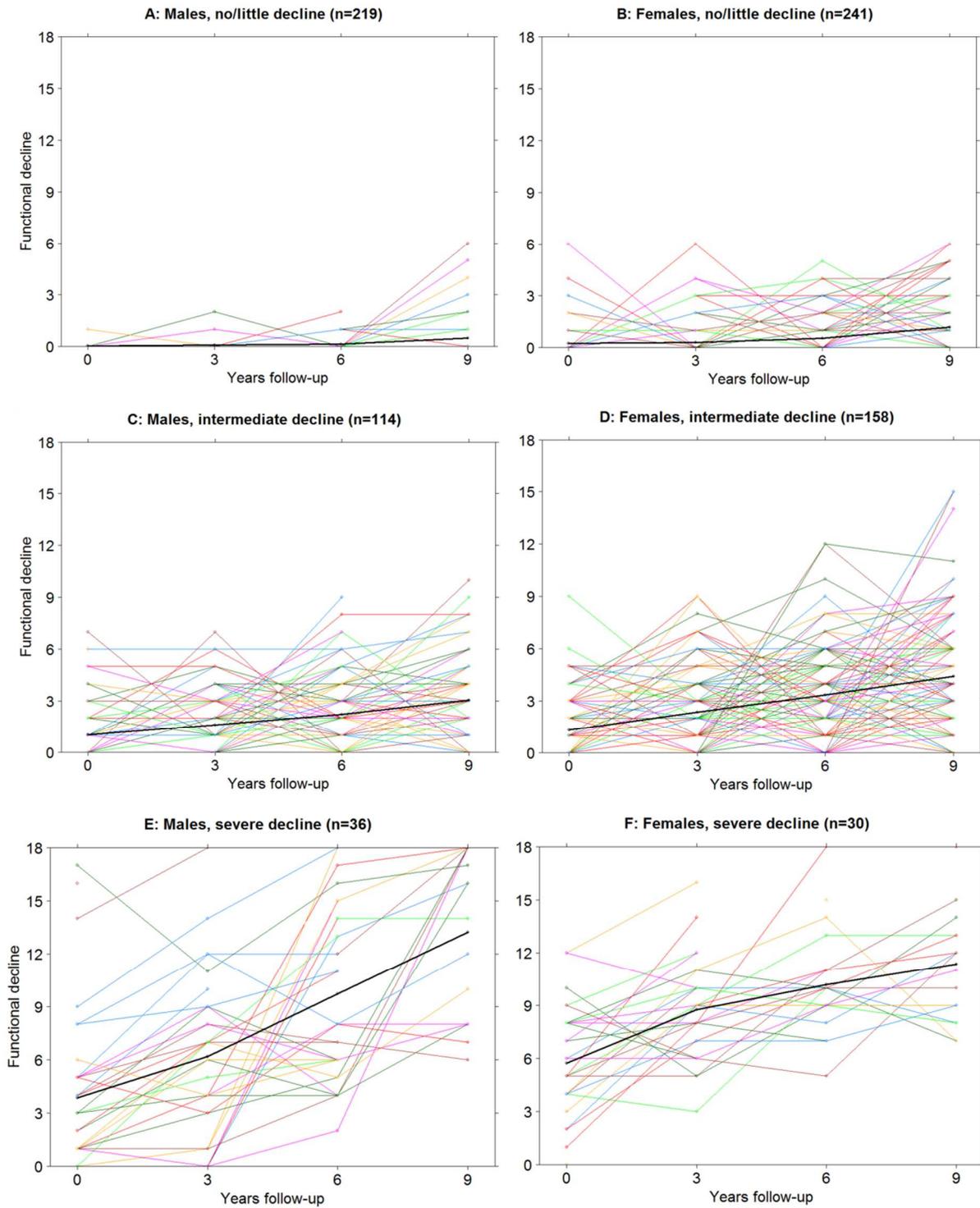
<sup>b</sup> Odds ratios for gait speed refer to standardized Z-scores since different tests were applied in the two cohorts to assess gait speed. Z-scores were calculated per cohort:

$$Z_{\text{males InCHIANTI}} = (m/s - 1.570)/0.256$$

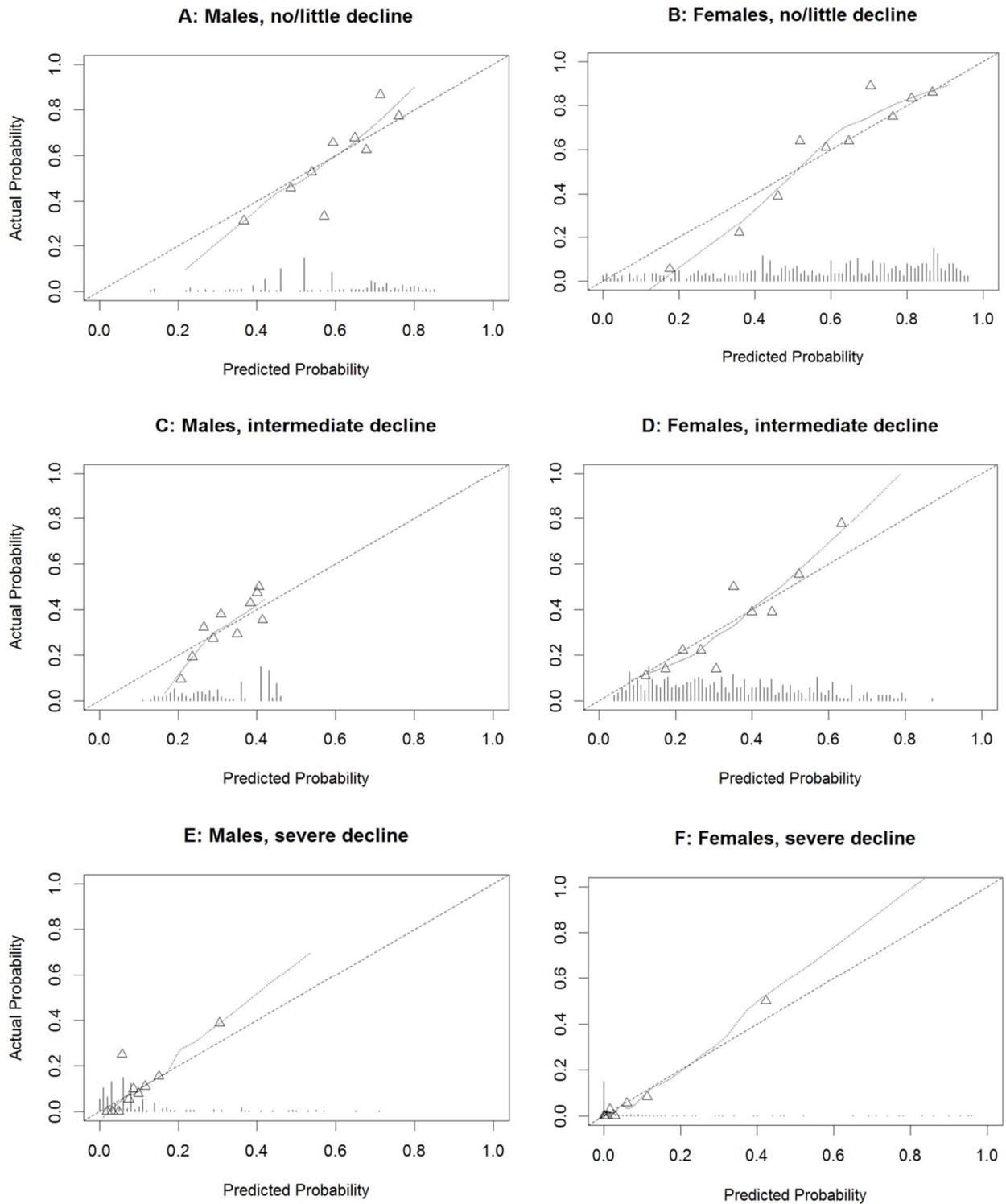
$$Z_{\text{males LASA}} = (m/s - 0.959)/0.257$$

$$Z_{\text{females InCHIANTI}} = (m/s - 1.271)/0.249$$

$$Z_{\text{females LASA}} = (m/s - 0.876)/0.242$$



**Supplementary Figure 1:** Individual trajectories on functional decline across nine years for (A) no/little decline in males, (B) no/little decline in females, (C) intermediate decline in males, (D) intermediate decline in females, (E) severe decline in males, and (F) severe decline in females.



**Supplementary Figure 2:** Calibration plots of predicted probabilities for the three outcome categories no/little decline in (A) males and (B) females, intermediate decline in (C) males and (D) females, and severe decline in (E) males and (F) females. The dotted line indicates the association between predicted and observed probabilities. The dashed line indicates perfect calibration. Triangles indicate deciles of participants grouped by similar predicted probabilities. Vertical lines indicate the distribution of predicted probabilities.

### References Supplementary Material

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