

SUPPLEMENTARY DATA

Supplementary Table 1. Characteristics of study participants, English Longitudinal Study of Ageing, n=10,798

Characteristics	N (%)	
	Development cohort (n=5377)	Validation cohort (n=5421)
Demographics		
Age		
50-59	1980 (36.8)	1983 (36.6)
60-64	820 (15.3)	782 (14.4)
65-69	782 (14.5)	855 (15.8)
70-74	674 (12.5)	719 (13.3)
75-79	516 (9.6)	516 (9.5)
80-84	387 (7.2)	363 (6.7)
≥85	218 (4.1)	203 (3.7)
Women	2934 (54.6)	2945 (54.3)
Education		
Higher degree	1178 (21.9)	1211 (22.4)
Intermediate	1879 (35.0)	1942 (35.8)
No qualifications	2316 (43.1)	2265 (41.8)
Marital status		
Married	3572 (66.4)	3643 (67.2)
Never married	302 (5.6)	278 (5.1)
Divorced	565 (10.5)	573 (10.6)
Widowed	937 (17.4)	926 (17.1)
Health behaviours and comorbidities		
Smoking status		
Never or former smoker	4375 (82.2)	4419 (82.6)
Current smoker	949 (17.8)	933 (17.4)
Alcohol use		
Less than daily	3828 (71.9)	3846 (71.9)
Daily or more	1496 (28.1)	1505 (28.1)
Vigorous physical activity		
Some	1967 (36.9)	1963 (36.7)
None	3357 (63.1)	3389 (63.3)
Hypertension	2042 (38.0)	2052 (37.9)
Diabetes	400 (7.4)	392 (7.23)
Cancer	331 (6.2)	362 (6.7)
Chronic lung disease	375 (7.0)	335 (6.2)
Heart failure	38 (0.7)	41 (0.8)
Other heart problems	1089 (20.3)	1185 (21.9)
Stroke	235 (4.4)	246 (4.5)
Psychiatric disease	372 (6.9)	396 (7.3)
Memory-related disease	39 (0.7)	47 (0.9)
Arthritis	1827 (34.0)	1713 (31.6)
History of falls	1047 (32.1)	1021 (30.9)
History of pain	2075 (39.0)	2049 (38.3)
Incontinence	838 (15.8)	819 (15.3)
Visual impairment	208 (3.9)	234 (4.3)
Hearing impairment	268 (5.0)	294 (5.4)
BMI <25*	1013 (28.3)	1142 (31.4)
Functional status variables		
Activities of daily living		
Bathing	661 (12.3)	664 (12.3)
Dressing	712 (13.2)	723 (13.3)
Toileting	191 (3.6)	197 (3.6)
Eating	83 (1.5)	113 (2.1)
Getting in or out of bed	364 (6.8)	351 (6.5)
Walking across the room	161 (3.0)	196 (3.6)

Instrumental activities of daily living		
Shopping	490 (9.1)	528 (9.7)
Preparing meals	220 (4.1)	263 (4.9)
Using the telephone	112 (2.1)	88 (1.6)
Managing medications	75 (1.4)	87 (1.6)
Managing finances	124 (2.3)	136 (2.5)
Doing work around the house or garden	850 (15.8)	883 (16.3)
Other functional variables		
Getting up from a chair after long periods	1438 (26.7)	1382 (25.5)
Sitting for about two hours	787 (14.6)	756 (14.0)
Walking 100 yards	665 (12.4)	683 (12.6)
Pushing or pulling heavy objects	959 (17.8)	992 (18.3)
Climbing 1 flight of stairs without resting	803 (14.9)	815 (15.0)
Climbing several flights without resting	1998 (37.2)	1927 (35.6)
Stooping, kneeling, or crouching	1960 (36.5)	1902 (35.1)
Picking up a 5p coin from a table	297 (5.5)	267 (4.9)
Reaching above one's shoulders	600 (11.2)	601 (11.1)
Lifting or carrying weights over 10lb	1405 (26.1)	1384 (25.5)
Using a map	275 (5.1)	304 (5.6)

Note: Numbers may not sum to the total in each of the development and validation cohorts due to missing data for some variables.

*BMI = body mass index, calculated as weight in kilograms divide by the square of height in metres

Supplementary Table 2. Bivariate analysis of risk factors for 10-year mortality in the development cohort

Risk factors	Number (%) of deaths	Unadjusted HR (95% CI)
Demographics		
Age		
50-59	117 (5.9)	1.0
60-64	89 (10.9)	1.91 (1.45-2.51)
65-69	144 (18.4)	3.35 (2.62-4.28)
70-74	214 (31.8)	6.29 (5.01-7.88)
75-79	251 (48.6)	10.94 (8.78-13.64)
80-84	259 (66.9)	17.70 (14.21-22.05)
≥85	187 (85.8)	32.04 (25.37-40.47)
Sex		
Women	632 (21.5)	1.0
Men	629 (25.8)	1.24 (1.11-1.38)
Education		
Higher degree	164 (13.9)	1.0
Intermediate	350 (18.6)	1.39 (1.15-1.67)
No qualifications	747 (32.3)	2.61 (2.20-3.09)
Marital status		
Married	645 (18.1)	1.0
Never married	91 (30.1)	1.77 (1.42-2.21)
Divorced	100 (17.7)	0.99 (0.80-1.22)
Widowed	425 (45.4)	3.04 (2.69-3.43)
Health behaviours and comorbidities		
Smoking status		
Never or former smoker	992 (22.7)	1.0
Current smoker	245 (25.8)	1.16 (1.01-1.33)
Alcohol use		
Less than daily	917 (24.0)	1.0
Daily	319 (21.3)	0.88 (0.77-1.00)
Vigorous physical activity		
Some	226 (11.5)	1.0
None	1011 (30.1)	2.96 (2.56-3.42)
Hypertension		
Absent	693 (20.8)	1.0
Present	568 (27.8)	1.38 (1.24-1.55)
Diabetes		
Absent	1125 (22.6)	1.0
Present	136 (34.0)	1.64 (1.37-1.96)
Cancer		
Absent	1137 (22.5)	1.0
Present	124 (37.5)	1.93 (1.60-2.32)
Chronic lung disease		
Absent	1099 (22.0)	1.0
Present	162 (43.2)	2.32 (1.96-2.73)
Heart failure		
Absent	1234 (23.1)	1.0
Present	27 (71.1)	4.95 (3.38-7.25)
Other heart problems		
Absent	855 (19.9)	1.0
Present	406 (37.3)	2.12 (1.88-2.38)
Stroke		
Absent	1135 (22.1)	1.0

Present	126 (53.6)	3.09 (2.57-3.72)
Psychiatric disease		
Absent	1191 (23.8)	1.0
Present	70 (18.8)	0.76 (0.60-0.97)
Memory-related disease		
Absent	1237 (23.2)	1.0
Present	24 (61.5)	3.73 (2.49-5.59)
Arthritis		
Absent	733 (20.7)	1.0
Present	528 (28.9)	1.46 (1.31-1.63)
History of falls		
Absent	664 (30.0)	1.0
Present	446 (42.6)	1.56 (1.38-1.76)
History of pain		
Absent	694 (21.4)	1.0
Present	543 (26.2)	1.27 (1.13-1.42)
Incontinence		
Absent	983 (22.0)	1.0
Present	251 (30.0)	1.45 (1.26-1.66)
Visual impairment		
Absent	1145 (22.2)	1.0
Present	116 (55.8)	3.37 (2.79-4.08)
Hearing impairment		
Absent	1153 (22.6)	1.0
Present	108 (40.3)	2.08 (1.71-2.54)
BMI*		
≥25	400 (15.6)	1.0
<25	150 (14.8)	0.95 (0.79-1.15)

Functional status variables

Activities of daily living		
Bathing		
No difficulty	934 (19.8)	1.0
Difficulty	327 (49.5)	3.15 (2.77-3.57)
Dressing		
No difficulty	976 (20.9)	1.0
Difficulty	285 (40.0)	2.17 (1.90-2.48)
Toileting		
No difficulty	1172 (22.6)	1.0
Difficulty	89 (46.6)	2.50 (2.02-3.11)
Eating		
No difficulty	1215 (23.0)	1.0
Difficulty	46 (55.4)	3.02 (2.25-4.06)
Getting in or out of bed		
No difficulty	1103 (22.0)	1.0
Difficulty	158 (43.4)	2.31 (1.96-2.74)
Walking across the room		
No difficulty	1166 (22.4)	1.0
Difficulty	95 (59.0)	3.65 (2.96-4.50)
Instrumental activities of daily living		
Shopping		
No difficulty	1001 (20.5)	1.0
Difficulty	260 (53.1)	3.42 (2.98-3.92)
Preparing meals		
No difficulty	1131 (21.9)	1.0
Difficulty	130 (59.1)	3.74 (3.12-4.49)
Using the telephone		
No difficulty	1188 (22.6)	1.0
Difficulty	73 (65.2)	4.16 (3.28-5.27)
Managing medications		
No difficulty	1220 (23.0)	1.0

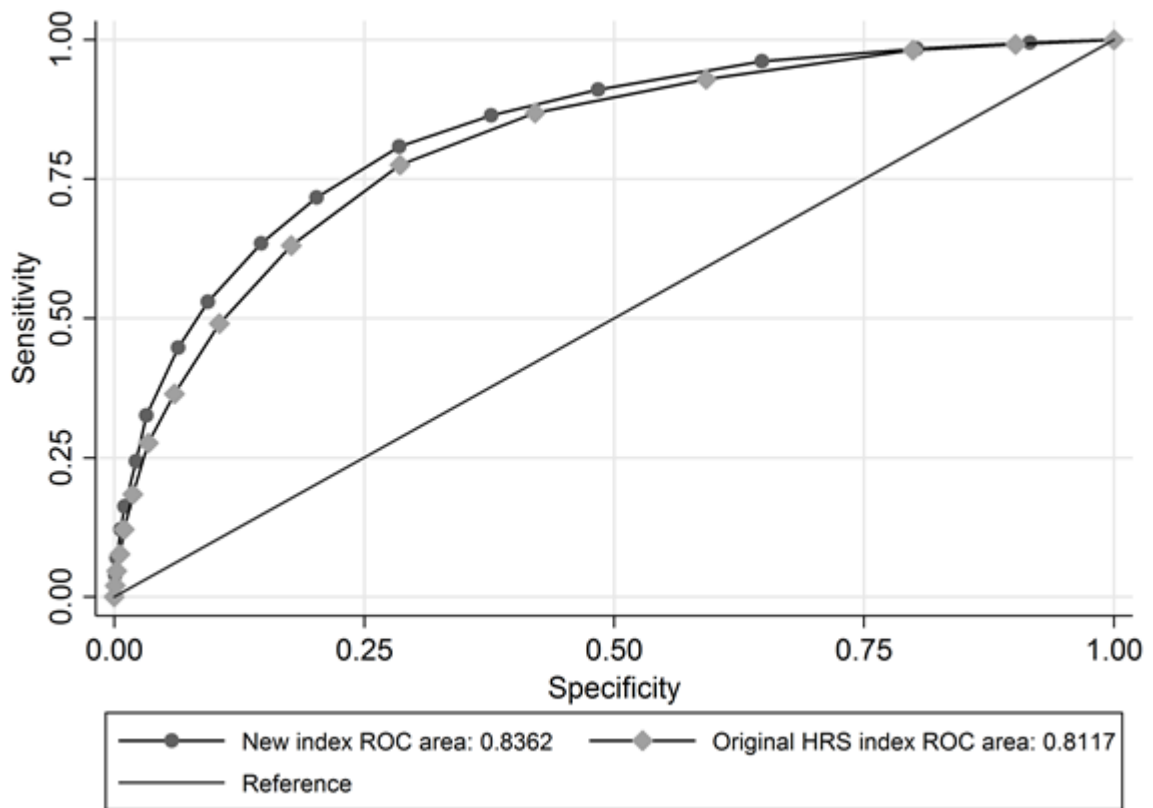
Difficulty	41 (54.7)	2.97 (2.18-4.06)
Managing finances		
No difficulty	1186 (22.6)	1.0
Difficulty	75 (60.5)	3.71 (2.94-4.68)
Doing work around the house or garden		
No difficulty	863 (19.1)	1.0
Difficulty	398 (46.8)	3.05 (2.71-3.44)
Other functional variables		
Getting up from a chair after long periods		
No difficulty	770 (19.6)	1.0
Difficulty	491 (34.1)	1.92 (1.72-2.15)
Sitting for about two hours		
No difficulty	1040 (22.7)	1.0
Difficulty	221 (28.1)	1.28 (1.11-1.48)
Walking 100 yards		
No difficulty	920 (19.5)	1.0
Difficulty	341 (51.3)	3.34 (2.95-3.79)
Pushing or pulling large objects		
No difficulty	840 (19.0)	1.0
Difficulty	421 (43.9)	2.78 (2.47-3.12)
Climbing 1 flight of stairs without resting		
No difficulty	873 (19.1)	1.0
Difficulty	388 (48.3)	3.19 (2.83-3.60)
Climbing several flights without resting		
No difficulty	560 (16.6)	1.0
Difficulty	701 (35.1)	2.39 (2.14-2.67)
Stooping, kneeling, or crouching		
No difficulty	614 (18.0)	1.0
Difficulty	647 (33.0)	2.02 (1.81-2.26)
Picking up a 5p coin from a table		
No difficulty	1141 (22.5)	1.0
Difficulty	120 (40.4)	2.02 (1.67-2.44)
Reaching above one's shoulders		
No difficulty	1054 (22.1)	1.0
Difficulty	207 (34.5)	1.72 (1.48-1.99)
Lifting or carrying weights over 10lb		
No difficulty	710 (17.9)	1.0
Difficulty	551 (39.2)	2.55 (2.28-2.85)
Using a map		
No difficulty	1131 (22.2)	1.0
Difficulty	130 (47.3)	2.66 (2.22-3.19)

Supplementary Table 3. Validation of the 10-year mortality risk index: comparing the model performance by point score in the development and validation cohorts and HRs for mortality risk at each point score

Score	Development cohort	Validation cohort	Whole sample (n=10674) HR (95% CI)
	(n=5323) No. died / No. at risk (%)	(n=5351) No. died / No. at risk (%)	
0	6/323 (1.9)	5/341 (1.5)	1.00
1	13/457 (2.8)	12/478 (2.5)	1.63 (0.80-3.30)
2	28/656 (4.3)	21/613 (3.4)	2.36 (1.23-4.53)
3	52/714 (7.3)	51/694 (7.4)	4.50 (2.42-8.38)
4	45/473 (9.5)	45/471 (9.6)	5.97 (3.19-11.17)
5	51/436 (11.7)	65/461 (14.1)	8.25 (4.44-15.31)
6	79/406 (19.5)	99/433 (22.9)	14.15 (7.69-26.01)
7	71/316 (22.5)	91/310 (29.4)	17.87 (9.70-32.91)
8	137/357 (38.4)	129/364 (35.4)	27.30 (14.93-49.89)
9	80/205 (39.0)	111/246 (45.1)	32.60 (17.75-59.87)
10	153/300 (51)	160/299 (53.5)	44.09 (24.16-80.44)
11	108/156 (69.2)	102/142 (71.8)	68.20 (37.18-125.1)
12	108/156 (69.2)	110/166 (66.3)	66.32 (36.18-121.6)
13	68/93 (73.1)	62/73 (84.9)	90.95 (49.13-168.4)
14	90/117 (76.9)	74/95 (77.9)	87.84 (47.70-161.8)
15	53/60 (88.33)	55/64 (85.9)	132.1 (71.03-245.8)
≥16	95/98 (96.9)	94/101 (93.1)	184.9 (100.6-339.9)
ROC area	0.855	0.859	-

Supplementary Table 4. Cox regression model predicting 10-year mortality in the whole ELSA sample – based on the original HRS index

Risk factors	Hazard ratio (95% CI)
Demographics	
Age	
60-64	2.01 (1.55-2.61)
65-69	3.36 (2.65-4.26)
70-74	6.78 (5.44-8.45)
75-79	10.22 (8.18-12.78)
80-84	20.17 (16.03-25.39)
≥85	36.77 (28.12-48.09)
Male sex	1.80 (1.60-2.03)
Health behaviours and comorbidities	
Diabetes	1.44 (1.21-1.73)
Cancer	1.84 (1.50-2.26)
Chronic lung disease	1.44 (1.19-1.74)
Heart failure	1.85 (1.19-2.90)
BMI <25	1.10 (0.96-1.25)
Current smoker	1.97 (1.69-2.29)
Functional status variables	
Difficulty bathing	1.30 (1.10-1.55)
Difficulty managing finances	1.52 (1.09-2.10)
Difficulty walking 100 yards (several blocks)	1.28 (1.07-1.54)
Difficulty pushing/pulling heavy objects	1.29 (1.09-1.52)



Supplementary Figure 1. Test of equality in ROC curve areas between the new ELSA and the original HRS index ($\chi^2 = 60.62$, $P < .001$)