

1 **Supplementary Material.**

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3 Table S1. Covariate predictors of falls, NHATS variable name, and survey question with
 4 response scheme.
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	NHATS variable name	Question and response schemes
Falls, any	hc1faleninyr	“In the last 12 months, have you fallen down?” [Yes/No]
Falls ≥ 2		“In the last 12 months, have you fallen down more than once?” [Yes/No]
Fear of falling	hc1worryfall	“In the last month, did you worry about falling down?” Yes/No
Depressed	hc1depresan2	“Over the last month, how often have you felt down, depressed, or hopeless?” [More than half the days, Nearly every day]
Problems with balance	ss1prbbalcrd	“In the last month, did you have problems with balance or coordination?” [Yes/No]
Use of cane or walker	md1canewlker	“In the last month, have you used a cane, walker, wheelchair, or scooter?” [Yes/No]
Hearing difficulty	ss1heringaid ss1hearphone	“In the last month, have you used a hearing aid or other hearing device?” “When you use a hearing aid, do you hear well enough to use the telephone?” [Yes/No]
Vision difficulty	ss1glasseswr ss1seewellst	“Do you wear glasses or contacts to help see things at a distance?” “When you use glasses or contacts, do you see well enough to recognize someone across the street?” [Yes/No]
Environmental Hazard	ir1condihom4 ir1condihom5	Flooring needs repair Home other tripping hazard

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12 Table S2. Correlations of Short Physical Performance Battery (SPPB) performance by year of
 13 assessment. Numbers in parentheses indicate number of individuals.
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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Year 1	1.0000 (5969)						
Year 2	0.7756 (5630)	1.0000 (5630)					
Year 3	0.7516 (5425)	0.7805 (5142)	1.0000 (5425)				
Year 4	0.7051 (4523)	0.7327 (4275)	0.7977 (4247)	1.0000 (4523)			
Year 5	0.6853 (2760)	0.7056 (2578)	0.7663 (2533)	0.8033 (2455)	1.0000 (2760)		
Year 6	0.6600 (2397)	0.6949 (2254)	0.7447 (2218)	0.7819 (2150)	0.8319 (2274)	1.0000 (2397)	
Year 7	0.6176 (2028)	0.6380 (1909)	0.7135 (1898)	0.7370 (1817)	0.7886 (1932)	0.8377 (1923)	1.0000 (2028)

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43 Table S3. Results of latent modeling to determine trajectory of Short Physical Performance
 44 Battery (SPPB) categories. Row 17 (bolded) had the highest Bayesian Information Criterion.
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N of groups	Bayesian Information Criterion	Akaike Information Criterion	Posterior Probability (lowest group)	Entropy	Smallest size of trajectory group
3	-53269.29	-53239.21	0.88	0.80	1055
4	-52230.09	-52189.99	0.87	0.79	641
5	-51845.99	-51795.86	0.81	0.76	358
6	-51677.83	-51617.66	0.75	0.70	242
7	-51600.56	-51530.37	0.74	0.66	155
8	-51579.18	-51498.96	0.65	0.64	114
9	-51459.48	-51369.24	0.72	0.59	66
10	-51407.08	-51306.81	0.65	0.65	71
11	-51360.96	-51250.66	0.65	0.59	25
12	-51358.49	-51238.17	0.61	0.60	52
13	-51316.98	-51186.63	0.58	0.55	25
14	-51318.34	-51177.97	0.46	0.49	28
15	-51275.2	-51124.8	0.47	0.49	26
16	-51284.77	-51124.34	0.49	0.50	5
17	-51258.81	-51088.35	0.55	0.57	14
18	-51291.77	-51111.29	0.49	0.49	5
19	-51302.24	-51111.73	0.46	0.47	22

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64 Table S4. Model performance and fit of the Cox proportional hazard models to predict time to ≥ 2
 65 falls.*

	Harrell's C	Gonen & Heller's K	Akaike Information Criterion	Bayesian Information Criterion
3-SPPB Trajectory Model	0.7019	0.6486	23426.14	23519.86
4-SPPB Trajectory Model	0.7018	0.6522	23426.04	23526.45
5-SPPB Trajectory Model	0.7039	0.6505	23420.15	23527.26
6-SPPB Trajectory Model	0.7048	0.6529	23415.13	23528.93
7-SPPB Trajectory Model	0.705	0.6543	23395.91	23516.41
8-SPPB Trajectory Model	0.7074	0.6573	23397.46	23524.65
9-SPPB Trajectory Model	0.7125	0.6666	23357.87	23491.75
10-SPPB Trajectory Model	0.7094	0.6612	23364.24	23504.82
11-SPPB Trajectory Model	0.7135	0.6668	23352.29	23499.56
12-SPPB Trajectory Model	0.7115	0.6614	23368.39	23522.36
13-SPPB Trajectory Model	0.7159	0.6677	23352.54	23513.20
14-SPPB Trajectory Model	0.7204	0.6745	23321.45	23508.90
15-SPPB Trajectory Model	0.7271	0.6793	23299.21	23506.73
16-SPPB Trajectory Model	0.7278	0.6804	23298.37	23512.59

66 SPPB = Short Physical Performance Battery

67 *All models included SPPB baseline, and all non-performance covariates presented in Table 2.

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79 Table S5. Predicted Cumulative probability of ≥ 2 falls by year of annual evaluation.
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	Predicted Cumulative Probability of ≥ 2 Falls, by Year (Median, IQR)	
	Model with baseline SPPB and non-performance variables	Model with baseline SPPB, non-performance variables, and 9-category SPPB trajectory
Predicted ≥ 2 falls at time = 1 years	2% (2-4%)	2% (2-3%)
Predicted ≥ 2 falls at time = 2 years	9% (6-14%)	9% (7-15%)
Predicted ≥ 2 falls at time = 3 years	16% (11-26%)	15% (11-26%)
Predicted ≥ 2 falls at time = 4 years	22% (15-36%)	22% (16-37%)
Predicted ≥ 2 falls at time = 5 years	29% (20-48%)	29% (21-49%)
Predicted ≥ 2 falls at time = 6 years	35% (24-57%)	35% (26-59%)
Predicted ≥ 2 falls at time = 7 years	41% (29-68%)	41% (31-70%)

81 SPPB= Short Physical Performance Battery

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98 Table S6. Cox proportional hazard models to predict time to ≥ 2 falls with all model variables as
 99 time-varying other than trajectory group.

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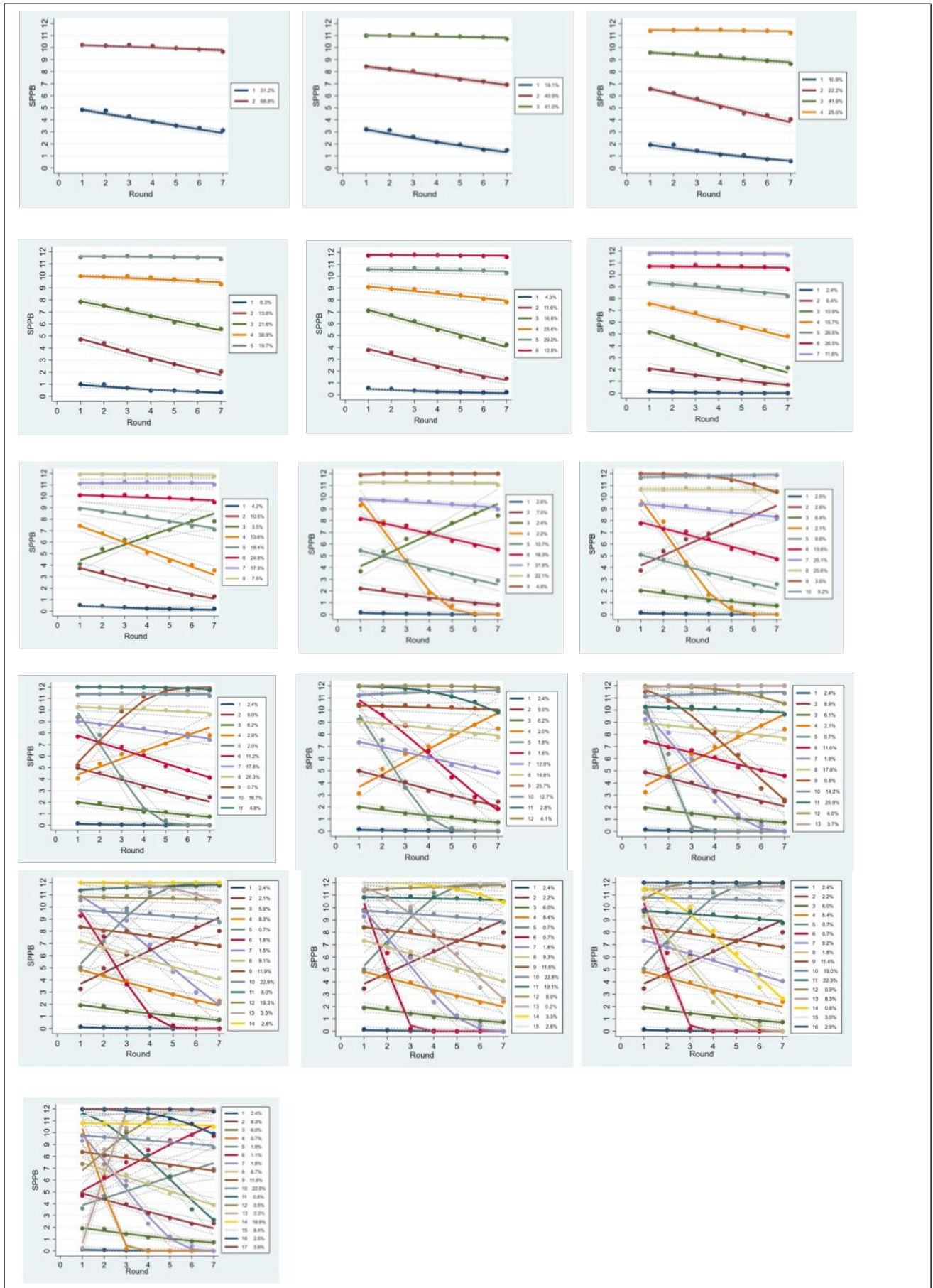
	HR (95% CI) (N=5969)
SPPB	1.02 (0.98-1.06)
Trajectory Group	
1	Ref
2	0.91 (0.57-1.47)
3	1.00 (0.66-1.51)
4	1.45 (0.89-2.36)
5	1.02 (0.67-1.53)
6	0.98 (0.62-1.53)
7	0.68 (0.42-1.10)
8	0.61 (0.36-1.04)
9	0.46 (0.26-0.81)
Covariates	
Fell once last 12m	2.00 (1.77-2.26)
Fear of falling	1.36 (1.18-1.58)
Depressed	1.15 (0.92-1.43)
Problems with balance	1.52 (1.31-1.76)
Use of cane or walker	1.22 (1.03-1.45)
Hearing problems	1.44 (1.06-1.94)
Vision problems	0.90 (0.71-1.13)
Dementia	
Possible	1.14 (0.94-1.38)
Probable	1.31 (1.07-1.60)
Environmental hazard	
Inapplicable	0.75 (0.55-1.02)
1 or more	1.16 (0.96-1.41)

102 Discrimination was not able to be calculated from a time-varying Cox proportional hazards
 103 model.

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Figure S1. Trajectory plots varying the number of trajectories from two to seventeen.



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