

Online Supplement

Short Physical Performance Battery: What Does Each Sub-Test Measure in Patients with Chronic Obstructive Pulmonary Disease?

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Statistical Analysis – Proportional Odds Assumption

The proportional odds assumption was checked using lower and upper boundary logistic regression models. A proportional odds model assumes the slopes (regression coefficients) of its covariates are equal across all categories. As the statistical program used was unable to test this assumption in the proportional odds models that included a random effect, lower and upper boundaries were calculated to determine if the slope estimates obtained from these models agreed reasonably well with those obtained from the boundary models. For three-category outcomes, the two lower categories were combined for a lower-boundary binary outcome and the two upper categories were combined for an upper-boundary binary outcome. For example, in SPPB total score with categories of <7, 7-9, and 10-12, the lower boundary binary outcome was 0-9 and 10-12 and the upper boundary binary outcome was <7 and 7-12. Multiple logistic regression was performed with both the lower and upper boundary binary outcomes using the same covariates as in the proportional odds model. The slope estimates from the lower- and upper-boundary logistic regression models were then compared to the estimates and standard errors from the proportional odds model. If the estimates for a particular covariate from the lower- and upper-boundary models were within one standard error of the estimate from the proportional odds model, then that covariate was considered to have equal slopes between all categories within the covariate. If the estimates did not fall within the one standard error of the estimate from the proportional odds model, then that covariate was considered to not have equal slopes between all categories. If the majority of the covariates had equal slopes, then the model was considered to obey the proportional odds assumption.

Supplemental Table S1. Baseline Characteristics of the Study Population by 5STS Score Categories

Characteristics at Baseline	5STS Score				
	0 (n=73)	1 (n=158)	2 (n=112)	3 (n=168)	4 (n=206)
Demographic measures					
Age (years), mean (SD)	67.6 (8.9)	68.8 (7.9)	68.1 (7.8)	66.3 (7.7)	66.7 (7.2)
Male, n (%)	34 (46.6%)	85 (53.8%)	68 (60.7%)	111 (66.1%)	134 (65%)
Currently married, n (%)	35 (47.9%)	81 (51.3%)	75 (70.1%)	110 (65.5%)	158 (77.5%)
Smoking status, current, n (%)	25 (34.2%)	42 (26.6%)	38 (34.9%)	59 (35.1%)	55 (26.8%)
Pack-years, mean (SD)	51.2 (29.6)	47.9 (27.2)	49 (28.2)	48.4 (24.8)	44.8 (29.5)
Anthropometric measures					
Body mass index (kg/m ²), mean (SD)	30.3 (6.4)	28.2 (6.3)	26.6 (4.9)	26.9 (6)	26.4 (4.9)
Fat-free mass index (kg/m ²), mean (SD)	18.7 (2.6)	18.1 (2.9)	17.8 (2.7)	18.1 (2.7)	18.2 (2.5)
COPD severity measures					
GOLD Grade ^a (2011), n (%)					
Grade A	1 (1.4%)	5 (3.2%)	10 (9.2%)	14 (8.5%)	21 (10.2%)
Grade B	11 (15.3%)	39 (25.3%)	31 (28.4%)	48 (29.1%)	68 (33.2%)
Grade C	2 (2.8%)	2 (1.3%)	4 (3.7%)	10 (6.1%)	15 (7.3%)
Grade D	58 (80.6%)	108 (70.1%)	64 (58.7%)	93 (56.4%)	101 (49.3%)
FVC, mean (SD)	2.3 (0.8)	2.6 (0.8)	2.8 (1)	3 (0.8)	3 (0.8)
FEV ₁ (l), mean (SD)	1.1 (0.5)	1.2 (0.5)	1.4 (0.5)	1.4 (0.5)	1.4 (0.5)
FEV ₁ , (% predicted), mean (SD)	47 (16.7)	50.7 (15.8)	53.7 (16.2)	52.5 (16.1)	54 (15.1)
FEV ₁ /FVC ratio, mean (SD)	0.5 (0.1)	0.5 (0.1)	0.5 (0.1)	0.5 (0.1)	0.5 (0.1)
Exacerbations in last 12 months, at least 1 event, median [IQR]	2 [1-4]	2 [0-3]	1 [0-3]	1 [0-3]	1 [0-3]
At least 1 exacerbation in the past 12 months, n (%)					
Yes	55 (76.4%)	114 (72.2%)	74 (68.5%)	109 (65.7%)	125 (61.3%)
No	17 (23.6%)	44 (27.8%)	34 (31.5%)	57 (34.3%)	79 (38.7%)
6MWT (meters), mean (SD)	198.1 (115.6)	258.8 (109.4)	339.2 (106.3)	385.8 (102.2)	426.1 (96.5)
BODE, median [IQR]	6 [4-7]	4 [3-6]	3 [1-4]	2 [1-4]	2 [1-3]
Patient reported outcome measures					
SGRQ total score, mean (SD)	63.2 (17.2)	57.7 (17.3)	48.6 (19.7)	46.7 (18.7)	39.9 (18)
CAT score, mean (SD)	25.3 (8.2)	23 (7.6)	19.4 (8)	18.8 (8.2)	16.2 (7.5)
mMRC score, median [IQR]	3 [2-4]	2 [1-3]	2 [1-2]	1 [1-2.5]	1 [1-2]
mMRC score, n (%)					
0-1	11 (15.3%)	43 (27.2%)	54 (49.5%)	91 (54.2%)	145 (70.7%)
2+	61 (84.7%)	115 (72.8%)	55 (50.5%)	77 (45.8%)	60 (29.3%)
Skeletal muscle measures					
Sniff nasal inspiratory pressure, cmH ₂ O, mean (SD)	42.5 (19.2)	50.5 (21.8)	52.5 (24.8)	59.9 (22.7)	60 (21.6)

Characteristics at Baseline	5STS Score				
	0 (n=73)	1 (n=158)	2 (n=112)	3 (n=168)	4 (n=206)
QMVC (kg), mean (SD)	23.2 (12.3)	26.1 (10.4)	30.8 (11.2)	32.4 (10.6)	34.6 (11)
QMVC predicted score, mean (SD)	44.2 (8.9)	43.5 (8.6)	43.6 (8.6)	44.5 (7.4)	44.9 (7.4)
QMVC % predicted, mean (SD)	50.6 (22.5)	59 (17.7)	70.2 (16.6)	71.5 (17.4)	76.6 (19.3)
SPPB total score, median [IQR]	5 [4-7]	8 [7-9]	10 [9-10]	11 [11-11]	12 [12-12]
SPPB 4m gait speed time (seconds), median [IQR]	6 [5.1-7.5]	5.2 [4.3-6.3]	4.3 [3.8-4.9]	3.9 [3.3-4.5]	3.6 [3-4.2]
SPPB 5 sit-to-stand chair rise time (seconds), median [IQR]	>60	21.1 [18.6-26]	14.9 [14.2-15.6]	12.4 [11.7-12.9]	9.8 [8.8-10.4]
Inflammatory biomarkers					
Fibrinogen, median [IQR]	3.6 [3.1-4.2]	3.4 [3-4]	3.5 [2.9-4]	3.4 [3-4.1]	3.2 [2.8-3.7]
Medical history					
Cardiovascular disease (excluding hypertension), n (%)	20 (27.4%)	40 (25.3%)	23 (21.1%)	34 (20.2%)	28 (13.7%)
Hypertension (self-report), n (%)	35 (48.6%)	74 (46.8%)	52 (48.1%)	69 (41.1%)	81 (39.5%)
High cholesterol, n (%)	36 (49.3%)	71 (44.9%)	50 (46.3%)	64 (38.3%)	71 (34.6%)
Diabetes, n (%)	10 (13.7%)	25 (15.8%)	15 (13.9%)	18 (10.7%)	13 (6.3%)
Other measures					
Ever done pulmonary rehabilitation, n (%)	33 (45.2%)	76 (48.4%)	45 (41.3%)	71 (42.3%)	67 (32.7%)
Completed pulmonary rehabilitation ^b , n (%)	31 (93.9%)	70 (94.6%)	43 (95.6%)	66 (93%)	63 (98.4%)
Time since pulmonary rehabilitation ^c , n (%)					
0-1 years	2 (6.5%)	3 (4.2%)	6 (13.6%)	7 (10.6%)	8 (13.3%)
1-2 years	10 (32.3%)	20 (28.2%)	6 (13.6%)	21 (31.8%)	19 (31.7%)
2+ years	19 (61.3%)	48 (67.6%)	32 (72.7%)	38 (57.6%)	33 (55%)

Statistical significance was assessed using univariable proportional odds models. See Supplemental Material for these data (Supplemental Table S5)

Percents were calculated excluding those with missing data. Missing information was <10% for all variables

^aCalculated using the COPD Assessment Test (CAT)

^b287 patients completed the question: 33 with 5STS 0, 74 with 5STS 1, 45 with 5STS 2, 71 with 5STS 3, 64 5STS 4

^c272 patients completed the question: 31 with 5STS 0, 71 with 5STS 1, 44 with 5STS 2, 66 with 5STS 3, 60 5STS

5STS=5-repetition sit-to-stand; 6MWT=6-minute walking test; BODE= Body-mass index, Obfstruction, Dyspnea, and Exercise; CAT=COPD Assessment Test; COPD=chronic obstructive pulmonary disease; FEV₁=forced expiratory volume in 1 second; FVC=forced vital capacity; GOLD=Global Initiative for Chronic Obstructive Pulmonary Disease; IQR=interquartile range; mMRC=modified Medical Research Council; QMVC=quadriceps maximal volitional contraction; SD=standard deviation; SGRQ=St. George's Respiratory Questionnaire; SPPB=Short Physical Performance Battery.

Supplemental Table S2. Baseline Characteristics of the Study Population by 4m Gait Speed Score Categories

Characteristics at Baseline	4mGS Score				
	0 (n=7)	1 (n=20)	2 (n=64)	3 (n=134)	4 (n=492)
Demographic measures					
Age (years), mean (SD)	71.4 (7.3)	70.7 (9.3)	69.5 (8)	68.6 (7.5)	66.6 (7.7)
Male, n (%)	1 (14.3%)	9 (45%)	26 (40.6%)	69 (51.5%)	327 (66.5%)
Currently married, n (%)	5 (71.4%)	11 (55%)	33 (51.6%)	67 (50%)	343 (70.7%)
Smoking status, current, n (%)	2 (28.6%)	6 (30%)	22 (34.4%)	47 (35.1%)	142 (29.1%)
Pack-years, mean (SD)	62.3 (31.4)	42.6 (18.9)	44.6 (28.6)	49.6 (24.8)	47.5 (28.7)
Anthropometric measures					
Body mass index (kg/m ²), mean (SD)	32.2 (8)	31.4 (6.8)	29.3 (7.3)	28 (6.1)	26.7 (5.2)
Fat-free mass index (kg/m ²), mean (SD)	18.6 (2.4)	18.9 (2.8)	18.1 (2.9)	17.8 (2.9)	18.2 (2.6)
COPD severity measures					
GOLD Grade ^a (2011), n (%)					
Grade A	1 (14.3%)	0 (0%)	1 (1.6%)	1 (0.8%)	48 (10%)
Grade B	1 (14.3%)	5 (25%)	11 (17.2%)	34 (25.8%)	146 (30.3%)
Grade C	0 (0%)	0 (0%)	1 (1.6%)	4 (3%)	28 (5.8%)
Grade D	5 (71.4%)	15 (75%)	51 (79.7%)	93 (70.5%)	260 (53.9%)
FVC, mean (SD)	2.2 (0.8)	2.2 (0.7)	2.1 (0.8)	2.4 (0.8)	3 (0.8)
FEV ₁ (l), mean (SD)	1.1 (0.4)	1.2 (0.4)	1.1 (0.5)	1.2 (0.5)	1.4 (0.5)
FEV ₁ , (% predicted), mean (SD)	51.7 (12.1)	49.9 (16)	48.9 (15.9)	48.8 (16.3)	53.6 (15.7)
FEV ₁ /FVC ratio, mean (SD)	0.5 (0.1)	0.5 (0.1)	0.5 (0.1)	0.5 (0.1)	0.5 (0.1)
Exacerbations in last 12 months, at least 1 event, median [IQR]	3 [2-4]	2.5 [1-4]	2 [1-4]	2 [0-3]	1 [0-3]
At least 1 exacerbation in the past 12 months, n (%)					
Yes	5 (83.3%)	16 (80%)	56 (87.5%)	95 (70.9%)	305 (63%)
No	1 (16.7%)	4 (20%)	8 (12.5%)	39 (29.1%)	179 (37%)
6MWT (meters), mean (SD)	242.8 (151.1)	167.8 (114.7)	181.1 (86.9)	253.3 (95.4)	396.4 (103.9)
BODE, median [IQR]	5 [2.5-7]	6 [5-7]	5 [4-6]	5 [3-6]	2 [1-4]
Patient reported outcome measures					
SGRQ total score, mean (SD)	59.8 (20.9)	64 (13.1)	62.9 (15.5)	57.9 (16.3)	44.1 (19.4)
CAT score, mean (SD)	24.6 (9.6)	23.5 (7.2)	25.5 (7.3)	22.9 (7.5)	17.9 (8.1)
mMRC score, median [IQR]	3 [2-4]	3 [2.5-4]	3 [2-3]	2 [1-3]	1 [1-2]
mMRC score, n (%)					
0-1	1 (14.3%)	1 (5%)	7 (10.9%)	35 (26.3%)	300 (61.5%)
2+	6 (85.7%)	19 (95%)	57 (89.1%)	98 (73.7%)	188 (38.5%)
Skeletal muscle measures					
Sniff nasal inspiratory pressure, cmH ₂ O, mean (SD)	26.8 (15)	47.5 (14.3)	41.1 (20.5)	45.5 (20.3)	60 (22.4)
QMVC (kg), mean (SD)	33.3 (23.5)	22.4 (12)	21.8 (8.4)	26.9 (11.5)	33 (10.9)

Characteristics at Baseline	4mGS Score				
	0 (n=7)	1 (n=20)	2 (n=64)	3 (n=134)	4 (n=492)
QMVC predicted score, mean (SD)	40.6 (6.5)	44.1 (9.4)	41.5 (8)	42.1 (8.3)	45.2 (7.7)
QMVC % predicted, mean (SD)	76.4 (58.7)	50.7 (23.6)	53.5 (19.3)	62.2 (19.6)	72.5 (18.6)
SPPB total score, median [IQR]	0 [0-1]	5 [3.5-5]	6 [5-7]	8 [7-9]	11 [10-12]
SPPB 4m gait speed time (seconds), median [IQR]	Did not complete	10.3 [9.7-15.1]	7 [6.5-7.6]	5.4 [5.1-5.7]	3.8 [3.2-4.2]
SPPB 5 sit-to-stand chair rise time (seconds), median [IQR]	>60	24.3 [22-29.8]	23.2 [17.6-29.2]	15.8 [12.3-19.3]	11.9 [10.1-14.4]
Inflammatory biomarkers					
Fibrinogen, median [IQR]	3.8 [3.5-4.9]	3.4 [3-4]	3.5 [3-4]	3.5 [3-4.1]	3.3 [2.9-3.8]
Medical history					
Cardiovascular disease (excluding hypertension), n (%)	2 (28.6%)	4 (20%)	23 (35.9%)	29 (21.6%)	87 (17.9%)
Hypertension (self-report), n (%)	5 (83.3%)	8 (40%)	35 (54.7%)	56 (41.8%)	207 (42.5%)
High cholesterol, n (%)	5 (71.4%)	7 (35%)	31 (48.4%)	59 (44.4%)	190 (39%)
Diabetes, n (%)	2 (28.6%)	3 (15%)	10 (15.6%)	22 (16.4%)	44 (9%)
Other measures					
Ever done pulmonary rehabilitation, n (%)	4 (57.1%)	5 (25%)	31 (48.4%)	67 (50%)	185 (38%)
Completed pulmonary rehabilitation ^b , n (%)	4 (100%)	5 (100%)	29 (96.7%)	63 (95.5%)	172 (94.5%)
Time since pulmonary rehabilitation ^c , n (%)					
0-1 years	0 (0%)	0 (0%)	2 (6.7%)	5 (7.9%)	19 (11.1%)
1-2 years	1 (33.3%)	2 (40%)	7 (23.3%)	17 (27%)	49 (28.7%)
2+ years	2 (66.7%)	3 (60%)	21 (70%)	41 (65.1%)	103 (60.2%)

Statistical significance was assessed using univariable proportional odds models. See Supplemental Material for these data (Supplemental Table S6)

Percents were calculated excluding those with missing data. Missing information was <10% for all variables

^aCalculated using the COPD Assessment Test (CAT)

^b287 patients completed the question: 4 with 4mGS 0, 5 with 4mGS 1, 30 with 4mGS 2, 66 with 4mGS 3, 182 with 4mGS 4

^c272 patients completed the question: 3 with 4mGS 0, 5 with 4mGS 1, 30 with 4mGS 2, 63 with 4mGS 3, 171 with 4mGS 4

5STS=5-repetition sit-to-stand; 6MWT=6-minute walking test; BODE= Body-mass index, Oairflow Obstruction, Dyspnea, and Exercise; CAT=COPD Assessment Test; COPD=chronic obstructive pulmonary disease; FEV₁=forced expiratory volume in 1 second; FVC=forced vital capacity; GOLD=Global Initiative for Chronic Obstructive Pulmonary Disease; IQR=interquartile range; mMRC=modified Medical Research Council; QMVC=quadriceps maximal volitional contraction; SD=standard deviation; SGRQ=St. George's Respiratory Questionnaire; SPPB=Short Physical Performance Battery.

Supplemental Table S3. Baseline Characteristics of the Study Population by Standing Balance Score Categories

Characteristics at Baseline	Standing Balance Score				
	0 (n=8)	1 (n=37)	2 (n=34)	3 (n=79)	4 (n=559)
Demographic measures					
Age (years), mean (SD)	70.3 (7.7)	70.2 (6.6)	71.9 (8)	69.7 (7.3)	66.6 (7.7)
Male, n (%)	2 (25%)	12 (32.4%)	15 (44.1%)	39 (49.4%)	364 (65.1%)
Currently married, n (%)	4 (50%)	14 (37.8%)	18 (52.9%)	45 (58.4%)	378 (68.2%)
Smoking status, current, n (%)	2 (25%)	13 (35.1%)	11 (32.4%)	24 (30.8%)	169 (30.4%)
Pack-years, mean (SD)	47 (31.3)	49.1 (26)	44.4 (18.9)	50.4 (35.8)	47.3 (27.1)
Anthropometric measures					
Body mass index (kg/m ²), mean (SD)	30.6 (5.9)	28.4 (6.5)	28.3 (7.1)	27.8 (6)	27.1 (5.6)
Fat-free mass index (kg/m ²), mean (SD)	18.5 (2.3)	17.6 (2.6)	18 (3)	17.8 (2.7)	18.2 (2.7)
COPD severity measures					
GOLD Grade ^a (2011), n (%)					
Grade A	0 (0%)	3 (8.1%)	1 (3%)	6 (7.9%)	41 (7.4%)
Grade B	3 (37.5%)	11 (29.7%)	9 (27.3%)	24 (31.6%)	150 (27.2%)
Grade C	1 (12.5%)	1 (2.7%)	0 (0%)	1 (1.3%)	30 (5.4%)
Grade D	4 (50%)	22 (59.5%)	23 (69.7%)	45 (59.2%)	330 (59.9%)
FVC, mean (SD)	2.5 (0.8)	2.2 (0.7)	2.4 (0.8)	2.5 (0.8)	2.9 (0.9)
FEV ₁ (l), mean (SD)	1.2 (0.5)	1.2 (0.5)	1.2 (0.5)	1.2 (0.4)	1.4 (0.5)
FEV ₁ , (% predicted), mean (SD)	54.5 (13.4)	54.1 (15.4)	54.9 (16.1)	52.5 (15)	51.8 (16.1)
FEV ₁ /FVC ratio, mean (SD)	0.5 (0.1)	0.6 (0.1)	0.5 (0.1)	0.5 (0.1)	0.5 (0.1)
Exacerbations in last 12 months, at least 1 event, median [IQR]	1 [0-4]	1 [0-3]	2 [0-4]	1 [0-3]	2 [0-3]
At least 1 exacerbation in the past 12 months, n (%)					
Yes	4 (57.1%)	24 (64.9%)	23 (67.6%)	51 (66.2%)	375 (67.8%)
No	3 (42.9%)	13 (35.1%)	11 (32.4%)	26 (33.8%)	178 (32.2%)
6MWT (meters), mean (SD)	293.8 (101.7)	265.6 (139.5)	245.3 (117.2)	295.7 (126.5)	365.1 (122.8)
BODE, median [IQR]	3 [3-6]	4 [2-6]	4 [2.5-6]	4 [2-6]	2 [1-5]
Patient reported outcome measures					
SGRQ total score, mean (SD)	55.5 (12.1)	53.1 (21.2)	56.2 (20.4)	51.7 (21.4)	48 (19.4)
CAT score, mean (SD)	22.1 (7.7)	21.1 (7.5)	22.8 (7.7)	21.4 (9.1)	19.2 (8.3)
mMRC score, median [IQR]	3 [2-3]	3 [1-4]	3 [2-4]	2 [1-3]	1 [1-2]
mMRC score, n (%)					
0-1	0 (0%)	13 (35.1%)	6 (17.6%)	25 (32.1%)	300 (54.1%)
2+	8 (100%)	24 (64.9%)	28 (82.4%)	53 (67.9%)	255 (45.9%)
Skeletal muscle measures					
Sniff nasal inspiratory pressure, cmH ₂ O, mean (SD)	40.7 (27.5)	45 (20.1)	39.9 (20.5)	47.9 (22)	57.8 (22.5)

Characteristics at Baseline	Standing Balance Score				
	0 (n=8)	1 (n=37)	2 (n=34)	3 (n=79)	4 (n=559)
QMVC (kg), mean (SD)	28.2 (12.9)	25.1 (11.3)	20.3 (8.9)	27.3 (11.1)	32 (11.3)
QMVC predicted score, mean (SD)	42 (8.6)	40.1 (6.6)	41 (8.9)	42.2 (7.8)	45 (7.9)
QMVC % predicted, mean (SD)	61.3 (18.8)	61.3 (22.5)	49.2 (17.9)	64.6 (21)	70.3 (19.5)
SPPB total score, median [IQR]	2 [0-6]	6 [4-7]	5 [5-7]	8 [7-10]	11 [9-12]
SPPB 4m gait speed time (seconds), median [IQR]	4.4 [3.9-5.3]	5.3 [4.2-6.3]	6 [5.2-7.3]	4.6 [3.9-6.2]	4 [3.4-4.8]
SPPB 5 sit-to-stand chair rise time (seconds), median [IQR]	9.1 [8.8-16.8]	16.1 [14.1-21.3]	19.5 [14.7-27.5]	15 [10.7-19.1]	12.5 [10.4-15.3]
Inflammatory biomarkers					
Fibrinogen, median [IQR]	3.5 [2.9-3.8]	3.5 [3-4.3]	3.3 [3.1-3.8]	3.5 [3-4]	3.3 [2.9-3.9]
Medical history					
Cardiovascular disease (excluding hypertension), n (%)	2 (25%)	13 (35.1%)	8 (23.5%)	21 (26.9%)	101 (18.2%)
Hypertension (self-report), n (%)	3 (42.9%)	17 (45.9%)	20 (58.8%)	40 (51.9%)	231 (41.5%)
High cholesterol, n (%)	6 (75%)	17 (45.9%)	13 (38.2%)	38 (49.4%)	218 (39.3%)
Diabetes, n (%)	1 (12.5%)	4 (10.8%)	5 (14.7%)	15 (19.5%)	56 (10.1%)
Other measures					
Ever done pulmonary rehabilitation, n (%)	4 (50%)	14 (37.8%)	17 (50%)	26 (33.3%)	231 (41.6%)
Completed pulmonary rehabilitation ^b , n (%)	4 (100%)	12 (85.7%)	17 (100%)	24 (100%)	216 (94.7%)
Time since pulmonary rehabilitation ^c , n (%)					
0-1 years	0 (0%)	1 (7.1%)	1 (6.3%)	0 (0%)	24 (11.2%)
1-2 years	1 (33.3%)	4 (28.6%)	6 (37.5%)	8 (33.3%)	57 (26.5%)
2+ years	2 (66.7%)	9 (64.3%)	9 (56.3%)	16 (66.7%)	134 (62.3%)

Statistical significance was assessed using univariable proportional odds models. See Supplemental Material for these data (Supplemental Table S7)

Percents were calculated excluding those with missing data. Missing information was <10% for all variables

^aCalculated using the COPD Assessment Test (CAT)

^b287 patients completed the question: 4 with standing balance 0, 14 with standing balance 1, 17 with standing balance 2, 24 with standing balance 3, 228 with standing balance 4

^c272 patients completed the question: 3 with standing balance 0, 14 with standing balance 1, 16 with standing balance 2, 24 with standing balance 3, 215 with standing balance 4

5STS=5-repetition sit-to-stand; 6MWT=6-minute walking test; BODE= Body-mass index, Obfstruction, Dyspnea, and Exercise; CAT=COPD Assessment Test; COPD=chronic obstructive pulmonary disease; FEV₁=forced expiratory volume in 1 second; FVC=forced vital capacity; GOLD=Global Initiative for Chronic Obstructive Pulmonary Disease; IQR=interquartile range; mMRC=modified Medical Research Council; QMVC=quadriceps maximal volitional contraction; SD=standard deviation; SGRQ=St. George's Respiratory Questionnaire; SPPB=Short Physical Performance Battery.

Supplemental Table S4. Unadjusted Proportional Odds Ratios for SPPB Total Score Groups <7, 7-9, 10-12 Eligible for Multivariable Analysis, Where p -value $\leq .15$

Covariates	Proportional Odds Ratio (95% CI)^a	p-value
Age (years)	1.05 (1.03-1.07)	<.0001
Sex		<.0001
Male	0.47 (0.35-0.63)	
Female	Reference	
Marriage Status		<.0001
Currently married	0.4 (0.29-0.54)	
Not married	Reference	
Site		<.0001
1	0.25 (0.14-0.43)	
2	0.45 (0.29-0.71)	
3	Reference	
4	0.41 (0.26-0.64)	
5	0.23 (0.12-0.44)	
Alcohol category (quartiles)		0.0002
0 units per week	Reference	
1-2 units per week	0.89 (0.55-1.43)	
3-12 units per week	0.57 (0.39-0.83)	
>12 units per week	0.46 (0.31-0.67)	
Body mass index (kg/m ²)	1.07 (1.04-1.09)	<.0001
FEV ₁ (100ml)	0.92 (0.89-0.95)	<.0001
Skeletal muscle measures		
Sniff nasal inspiratory pressure, cmH ₂ O	0.97 (0.96-0.98)	<.0001
QMVC (kg)	0.93 (0.91-0.94)	<.0001
Physical performance measures		
6MWT (per 30 meters)	0.7 (0.67-0.74)	<.0001
Log of pre-walk O ₂ saturation (%)	0 (0-0.66)	0.0366
Health status measures		
SGRQ total score	1.04 (1.03-1.05)	<.0001
CAT score	1.08 (1.06-1.11)	<.0001
Breathlessness measures		
mMRC score		<.0001
0-1	Reference	
2+	4.94 (3.59-6.79)	
Biomarkers		
Log of fibrinogen	2.38 (1.25-4.53)	0.0085
Log of hsCRP	1.3 (1.13-1.49)	0.0002
Log of WBC	1.66 (0.98-2.81)	0.0588
Medical history		

Covariates	Proportional Odds Ratio (95% CI)^a	p-value
Cardiovascular disease (excluding hypertension)		0.0012
Yes	1.78 (1.26-2.53)	
No	Reference	
Hypertension (self-report)		0.1020
Yes	1.27 (0.95-1.71)	
No	Reference	
High cholesterol		0.0086
Yes	1.48 (1.1-1.98)	
No	Reference	
Diabetes		0.0049
Yes	1.87 (1.21-2.9)	
No	Reference	
Peripheral vascular disease		0.1102
Yes	1.66 (0.89-3.1)	
No	Reference	
2 or more exacerbations in the last 12 months		0.0254
Yes	1.39 (1.04-1.86)	
No	Reference	
Other variables		
Phlegm		0.1064
Yes	1.58 (0.91-2.76)	
No	Reference	
Chronic bronchitis		0.0005
Yes	1.69 (1.26-2.27)	
No	Reference	
Snore		0.0644
Yes	0.75 (0.56-1.02)	
No	Reference	
Epworth sleepiness scale	1.06 (1.03-1.1)	<.0001
Ever smoked social drugs		0.0289
Yes	0.33 (0.12-0.89)	
No	Reference	
Ever done pulmonary rehabilitation		0.0199
Yes	1.42 (1.06-1.9)	
No	Reference	
Shortness of breath		<.0001
No	Reference	
All the time	4.86 (1.71-13.87)	
Worse at certain times of the day	1.9 (0.66-5.44)	

Covariates	Proportional Odds Ratio (95% CI)^a	p-value
With exercise only	1.12 (0.39-3.2)	
Night only	Insufficient N	

^aOdds ratios show the odds of being functionally weaker (going down an SPPB total score category) as the covariate is increased by 1 unit (continuous) or compared to a reference category (categorical)

6MWT=6-minute walking test; CAT=COPD Assessment Test; CI=confidence interval; FEV₁=forced expiratory volume in 1 second; hsCRP=high sensitivity C-reactive protein; mMRC=modified Medical Research Council; QMVC=quadriceps maximal volitional contraction; SGRQ=St. George's Respiratory Questionnaire; SPPB=Short Physical Performance Battery; WBC=white blood cell.

Supplemental Table S5. Unadjusted Proportional Odds Ratios for 5STS Score Groups 0-1, 2-3, 4 Eligible for Multivariable Analysis, Where p -value $\leq .15$

Covariates	Proportional Odds Ratio (95% CI)^a	p-value
Age (years)	1.01 (0.99-1.03)	0.1663
Sex		0.0141
Male	0.68 (0.51-0.93)	
Female	Reference	
Marriage status		<.0001
Currently married	0.44 (0.32-0.61)	
Not married	Reference	
Site		<.0001
1	0.36 (0.22-0.58)	
2	0.51 (0.32-0.79)	
3	Reference	
4	0.57 (0.36-0.88)	
5	0.46 (0.26-0.79)	
Smoking status		0.1451
Current smoker	1.27 (0.92-1.75)	
Former smoker	Reference	
Alcohol category (quartiles)		0.0938
0 units per week	Reference	
1-2 units per week	1.03 (0.63-1.71)	
3-12 units per week	0.75 (0.51-1.1)	
>12 units per week	0.65 (0.44-0.95)	
Body mass index (kg/m ²)	1.06 (1.03-1.09)	<.0001
FEV ₁ (100ml)	0.95 (0.92-0.98)	0.0004
Skeletal muscle measures		
Sniff nasal inspiratory pressure, cmH ₂ O	0.98 (0.98-0.99)	<.0001
QMVC (kg)	0.95 (0.94-0.96)	<.0001
Physical performance measures		
6MWT (per 30 meters)	0.75 (0.72-0.79)	<.0001
Log of pre-walk O ₂ saturation (%)	0.01 (0-5.03)	0.1387
Health status measures		
SGRQ total score	1.04 (1.03-1.05)	<.0001
CAT score	1.08 (1.06-1.11)	<.0001
Breathlessness measures		
mMRC score		<.0001
0-1	Reference	
2+	4.12 (2.98-5.7)	
Biomarkers		
Log of fibrinogen	3.73 (1.93-7.22)	<.0001

Covariates	Proportional Odds Ratio (95% CI)^a	p-value
Log of hsCRP	1.29 (1.12-1.49)	0.0004
Log of WBC	1.95 (1.14-3.35)	0.0150
Medical history		
Cardiovascular disease (excluding hypertension)		0.0035
Yes	1.75 (1.2-2.55)	
No	Reference	
Hypertension (self-report)		0.1196
Yes	1.27 (0.94-1.71)	
No	Reference	
High cholesterol		0.0141
Yes	1.46 (1.08-1.98)	
No	Reference	
Diabetes		0.0166
Yes	1.79 (1.11-2.88)	
No	Reference	
2 or more exacerbations in the last 12 months		0.0084
Yes	1.49 (1.11-2.01)	
No	Reference	
Other variables		
Phlegm		0.0205
Yes	1.85 (1.1-3.11)	
No	Reference	
Chronic bronchitis		<.0001
Yes	1.96 (1.44-2.68)	
No	Reference	
Epworth sleepiness scale	1.07 (1.04-1.11)	<.0001
Ever done pulmonary rehabilitation		0.0080
Yes	1.51 (1.11-2.04)	
No	Reference	
Shortness of breath		<.0001
No	Reference	
All the time	4.89 (1.92-12.45)	
Worse at certain times of the day	2.68 (1.06-6.78)	
With exercise only	1.66 (0.67-4.13)	
Night only	4.89 (0.24-99.65)	

^aOdds ratios show the odds of being functionally weaker (going down a 5STS score category) as the covariate is increased by 1 unit (continuous) or compared to a reference category (categorical)

5STS=5-repetition sit-to-stand; 6MWT=6-minute walking test; CAT=COPD Assessment Test; CI=confidence interval; FEV₁=forced expiratory volume in 1 second; hsCRP=high sensitivity C-reactive protein; mMRC=modified Medical Research Council; QMVC=quadriceps maximal volitional contraction;

SGRQ=St. George's Respiratory Questionnaire; SPPB=Short Physical Performance Battery; WBC=white blood cell.

Supplemental Table S6. Unadjusted Proportional Odds Ratios for 4m Gait Speed Score Groups 0-2, 3, 4 Eligible for Multivariable Analysis, Where p -value $\leq .15$

Covariates	Proportional Odds Ratio (95% CI)^a	p-value
Age (years)	1.05 (1.02-1.07)	<.0001
Sex		<.0001
Male	0.43 (0.31-0.59)	
Female	Reference	
Marriage status		<.0001
Currently married	0.47 (0.34-0.64)	
Not married	Reference	
Site		<.0001
1	0.3 (0.17-0.54)	
2	0.37 (0.22-0.61)	
3	Reference	
4	0.31 (0.18-0.52)	
5	0.29 (0.14-0.58)	
Alcohol category		<.0001
0 units per week	Reference	
1-2 units per week	0.89 (0.54-1.46)	
3-12 units per week	0.66 (0.44-0.98)	
>12 units per week	0.33 (0.21-0.52)	
Body mass index (kg/m ²)	1.07 (1.04-1.1)	<.0001
FEV ₁ (100ml)	0.88 (0.85-0.91)	<.0001
Skeletal muscle measures		
Sniff nasal inspiratory pressure, cmH ₂ O	0.96 (0.96-0.97)	<.0001
QMVC (kg)	0.93 (0.91-0.95)	<.0001
Physical performance measures		
6MWT (per 30 meters)	0.67 (0.63-0.7)	<.0001
Health status measures		
SGRQ total score	1.05 (1.04-1.06)	<.0001
CAT score	1.1 (1.07-1.12)	<.0001
Breathlessness measures		
mMRC score		<.0001
0-1	Reference	
2+	6.78 (4.66-9.87)	
Biomarkers		
Log of fibrinogen	2.92 (1.46-5.87)	0.0026
Log of hsCRP	1.32 (1.14-1.53)	0.0002
Log of WBC	2.7 (1.52-4.79)	0.0007
Medical history		
Cardiovascular disease (excluding hypertension)		0.0055

Covariates	Proportional Odds Ratio (95% CI)^a	p-value
Yes	1.68 (1.17-2.43)	
No	Reference	
High cholesterol		0.0906
Yes	1.31 (0.96-1.8)	
No	Reference	
Diabetes		0.0055
Yes	1.9 (1.21-2.98)	
No	Reference	
Peripheral vascular disease		0.1496
Yes	1.61 (0.84-3.09)	
No	Reference	
2 or more exacerbations in the last 12 months		0.0004
Yes	1.77 (1.29-2.43)	
No	Reference	
Other variables		
Chronic bronchitis		<.0001
Yes	2.12 (1.54-2.91)	
No	Reference	
Snore		0.0981
Yes	0.76 (0.55-1.05)	
No	Reference	
Epworth sleepiness scale	1.04 (1-1.07)	0.0254
Ever smoked social drugs		0.0423
Yes	0.28 (0.08-0.96)	
No	Reference	
Ever done pulmonary rehabilitation		0.0285
Yes	1.42 (1.04-1.94)	
No	Reference	
Use oxygen at home		0.1312
Yes	1.69 (0.86-3.34)	
No	Reference	
Shortness of breath		<.0001
No	Reference	
All the time	10 (2.22-45.16)	
Worse at certain times of the day	4.18 (0.92-18.99)	
With exercise only	1.8 (0.4-8.21)	
Night only	Insufficient N	

^aOdds ratios show the odds of being functionally weaker (going down a 4m gait speed score category) as the covariate is increased by 1 unit (continuous) or compared to a reference category (categorical)

6MWT=6-minute walking test; CAT=COPD Assessment Test; CI=confidence interval; FEV₁=forced expiratory volume in 1 second; hsCRP=high sensitivity C-reactive protein; mMRC=modified Medical Research Council; QMVC=quadriceps maximal volitional contraction; SGRQ=St. George's Respiratory Questionnaire; SPPB=Short Physical Performance Battery; WBC=white blood cell.

Supplemental Table S7. Unadjusted Proportional Odds Ratios for Standing Balance Score Groups 0-2, 3, 4 Eligible for Multivariable Analysis, Where p -value $\leq .15$

Covariates	Proportional Odds Ratio (95% CI)^a	p-value
Age (years)	1.07 (1.04-1.1)	<.0001
Sex		<.0001
Male	0.4 (0.28-0.56)	
Female	Reference	
Marriage status		<.0001
Currently married	0.49 (0.34-0.7)	
Not married	Reference	
Site		<.0001
1	0.34 (0.17-0.67)	
2	0.79 (0.48-1.29)	
3	Reference	
4	0.12 (0.05-0.29)	
5	0.21 (0.08-0.55)	
Alcohol category		0.0327
0 units per week	Reference	
1-2 units per week	0.87 (0.5-1.54)	
3-12 units per week	0.6 (0.38-0.96)	
>12 units per week	0.54 (0.33-0.87)	
Body mass index (kg/m ²)	1.03 (1-1.06)	0.0292
FEV ₁ (100ml)	0.95 (0.91-0.98)	0.0021
Skeletal muscle measures		
Sniff nasal inspiratory pressure, cmH ₂ O	0.97 (0.96-0.98)	<.0001
QMVC (kg)	0.94 (0.92-0.96)	<.0001
Physical performance measures		
6MWT (per 30 meters)	0.85 (0.81-0.89)	<.0001
Health status measures		
SGRQ total score	1.01 (1-1.02)	0.0037
CAT score	1.04 (1.01-1.06)	0.0014
Breathlessness measures		
mMRC score		<.0001
0-1	Reference	
2+	3.05 (2.08-4.48)	
Biomarkers		
Log of hsCRP	1.27 (1.08-1.5)	0.0044
Medical history		
Cardiovascular disease (excluding hypertension)		0.0070
Yes	1.75 (1.16-2.62)	
No	Reference	
Hypertension (self-report)		0.0279

Covariates	Proportional Odds Ratio (95% CI)^a	p-value
Yes	1.49 (1.04-2.12)	
No	Reference	
High cholesterol		0.0803
Yes	1.37 (0.96-1.96)	
No	Reference	
Diabetes		0.0694
Yes	1.6 (0.96-2.65)	
No	Reference	
Other variables		
Snore		0.0128
Yes	0.63 (0.44-0.91)	
No	Reference	
Shortness of breath		0.0006
No	Reference	
All the time	0.92 (0.35-2.44)	
Worse at certain times of the day	0.44 (0.16-1.19)	
With exercise only	0.39 (0.15-1.05)	
Night only	Insufficient N	

^aOdds ratios show the odds of being functionally weaker (going down a standing balance score category) as the covariate is increased by 1 unit (continuous) or compared to a reference category (categorical)

6MWT=6-minute walking test; CAT=COPD Assessment Test; CI=confidence interval; FEV₁=forced expiratory volume in 1 second; hsCRP=high sensitivity C-reactive protein; mMRC=modified Medical Research Council; QMVC=quadriceps maximal volitional contraction; SGRQ=St. George's Respiratory Questionnaire; SPPB=Short Physical Performance Battery.