WEB MATERIAL

Prediction of Severe Persistent Activity of Daily Living Disability in Older Adults

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Web Table 1. List of Potential Predictors of Activity of Daily Living Dependence

Domain	Predictors (Response Category)
Demographic characteristics	Age (< 70, 70-74, 75-79, ≥ 80 years)
	Sex (male, female)
	Race (African American race, otherwise)
Socioeconomic status and support system	Education (< 8, 8-11, ≥ 12 years)
	Currently working at a paying job (yes, no)
	Income level in the past year (< $5,000, $5,000-9,999, ≥ $10,000)
	Household composition (alone, spouse, others)
Sensory impairment	Can hear and understand a normal voice in a quiet room (yes, no)
	Read ordinary newspaper print (yes, no)
Self-rated health, symptoms, and medical history	Self-rated health (excellent, good, fair, poor)
	Weight loss more than 10 lbs in the past year (yes, no)
	Chest pain on walking at an ordinary pace on level ground (yes, no)
	Leg pain on walking (yes, no)
	Shortness of breath requiring stop and rest (yes, no)
	Felt that everything I did was an effort (yes, no)
	Felt depressed (yes, no)
	Diabetes mellitus (yes, no)
	Ever had myocardial infarction (yes, no)
	Ever had stroke or brain hemorrhage (yes, no)
	Ever had a cancer (yes, no)
	Ever fractured a hip (yes, no)
	Number of hospitalization in the past year (none, 1, ≥ 2)
	Ever stayed in a nursing home as a patient (yes, no)
Functional assessment and physical examination	Cognitive function (normal, mild, moderate or severe)[a]
	Able to walk half a mile without help (yes, no)
	Able to do heavy housework (yes, no)
	Difficulty in pulling or pushing large objects (none, a little/some, a lot, unable to do)
	Difficulty in writing or handling small objects (none, a little/some, a lot, unable to do)
	Body mass index category (< 25, 25-29, ≥ 30 kg/m^2)
	Systolic blood pressure category (< 140, 140-159, ≥ 160 mmHg)

[a] Cognitive function was classified as normal if the number of errors on the Short Portable Mental Status Questionnaire ≤ 2; mild if 3 or 4; and moderate to severe if ≥ 5 (of 9).(1)

Web Table 2. Cause-Specific Hazards Model for Severe Persistent Activity of Daily Living Dependence and Death in the Derivation Cohort, the Established Populations for Epidemiologic Studies of the Elderly, United States, 1981-1987 and 1985-1992

		Event of Interest: ADL Dependence		Competing Event: Death without ADL Dependence	
Predictors	**Response Categories**	**HR[a]**	**95% CI**	**HR[a]**	**95% CI**
Currently working at a paying job	No versus yes	1.98	1.27, 3.09	1.19	0.98, 1.44
Able to read ordinary newspaper print	No versus yes	1.45	1.18, 1.78	1.05	0.90, 1.22
Self-rated health: (modified by age)[b]	Per each category increase				
Age < 70 years	(Excellent/good, fair, or poor)	1.78	1.40, 2.28	1.35	1.18, 1.54
Age 70-74 years		1.47	1.25, 1.73	1.31	1.20, 1.43
Age 75-79 years		1.21	1.07, 1.38	1.21	1.17, 1.38
Age ≥ 80 years		1.00	0.84, 1.19	1.23	1.09, 1.39
Diabetes mellitus	Yes versus no	1.35	1.09, 1.67	1.38	1.21, 1.57
Ever had stroke or brain hemorrhage	Yes versus no	1.70	1.29, 2.24	1.42	1.18, 1.72
Cognitive function[c]	Per each category increase (Normal, mild, or moderate/severe)	1.85	1.64, 2.08	1.26	1.16, 1.38
Able to walk half a mile	No versus yes	1.61	1.33, 1.96	1.35	1.19, 1.53
Able to do heavy housework	No versus yes	1.47	1.21, 1.78	1.30	1.15, 1.46

Abbreviations: ADL, activity of daily living; CI, confidence interval; HR, hazard ratio.

[a] Age-stratified, cause-specific Cox models that included all predictors in the table and indicators for study sites were fitted for the event of interest (severe persistent ADL dependence) and competing event (death without severe persistent ADL dependence).

[b] The association between self-rated health and the outcome differed across age categories, representing a significant interaction ($p < 0.001$).

[c] Cognitive function was classified as normal if the number of errors on the Short Portable Mental Status Questionnaire ≤ 2; mild if 3 or 4; and moderate to severe if ≥ 5 (of 9).(1)

Web Table 3. Validation Studies of Risk Assessment Models and Frailty Indices for Community-Dwelling Older Adults

	Operationalization of Frailty			Prediction of Functional Decline		
Model	**CHS Index(2, 3)**	**SOF Index(2, 3)**	**Frailty Index(4, 5)**	**Sarkisian et al.(6)**	**SPPB(7)**	**VES – 13(8)**
Predictors						
Self-Reported	Weight loss Exhaustion Low physical activity	Weight loss Reduced energy level	Number of deficits of 20-40 symptoms, signs, diseases, and ADL/IADL disabilities	Benzodiazepine use Low exercise level	-	Age, self-rated health 6 physical limitations, 5 ADL/IADL dependence
Measured	Grip strength Gait speed	Chair stands	Cognitive function	Visual acuity < 20/40 BMI ≥ 29 kg/m^2 Depression scale Gait speed	Standing balance Gait speed Chair stands	-
Population	Non-disabled men and women	Non-disabled men and women	Non-disabled, disabled, and frail men and women	Disabled and non-disabled women	Non-disabled men and women	Frail men and women with a geriatric syndrome
Outcome	Difficulty with IADLs, fall, fracture, or death	Difficulty with IADLs, fall, fracture, or death	Institutionalization or death	Worsening ADL dependence	Mobility disability plus ADL dependence	Decline in ADL/IADLs, institutionalization, or death
Performance						
Calibration	NR	NR	NR	No lack of fit	No lack of fit	NR
C Statistic	0.64-0.68*	0.64-0.68*	NR	0.76†	0.69‡	0.75

Abbreviations: ADL, activity of daily living; BMI, body mass index; CHS, Cardiovascular Health Study; IADL, instrumental activity of daily living; NR, not reported; SOF, Study of Osteoporotic Fractures; SPPB, Short Physical Performance Battery; VES, Vulnerable Elder Survey.

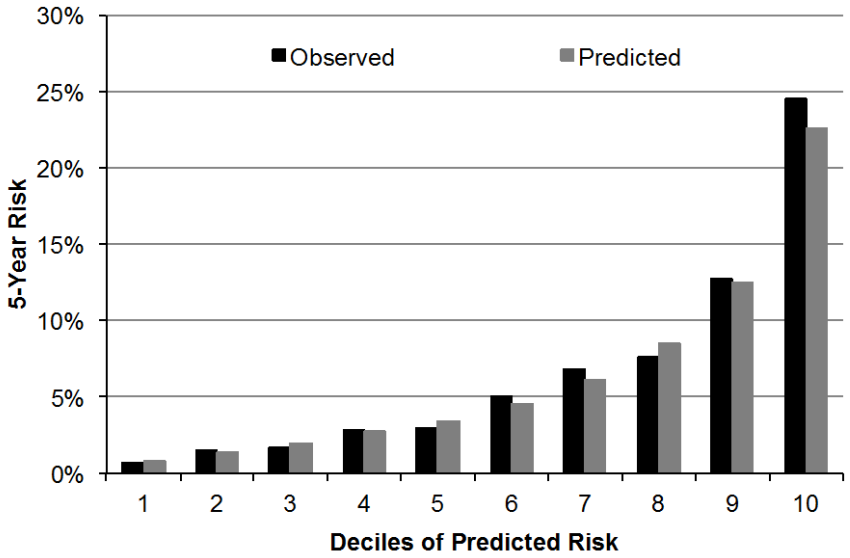
* The model included age.

† The model included age, education, cognitive function, medical comorbidity, current smoking, and presence of spine fracture.

‡ The model included age, sex, and number of chronic conditions.

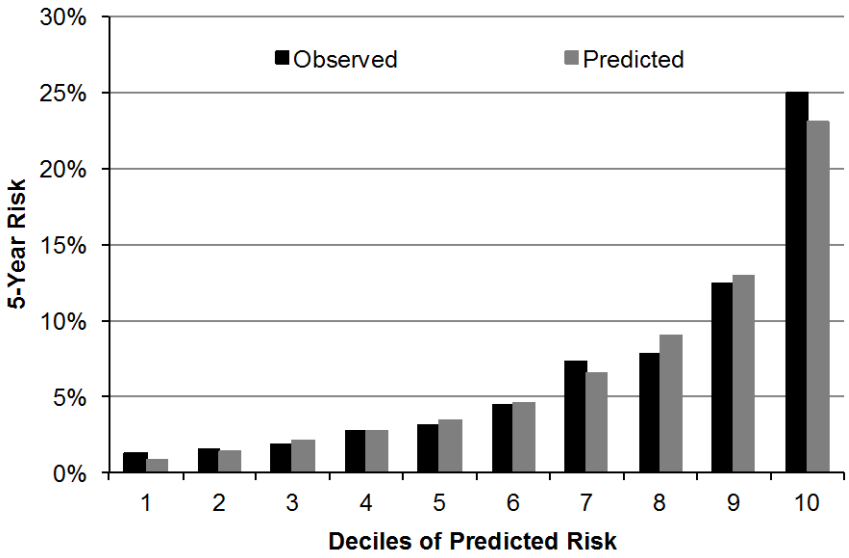
Web Figure 1. Calibration of the Cause-Specific Hazards Model in the Derivation and Validation Cohorts, the Established Populations for Epidemiologic Studies of the Elderly, United States, 1981-1987 and 1985-1992[a]

A. Derivation Cohort (N = 8,301)



Goodness of Fit chi-square = 5.50; p=0.79

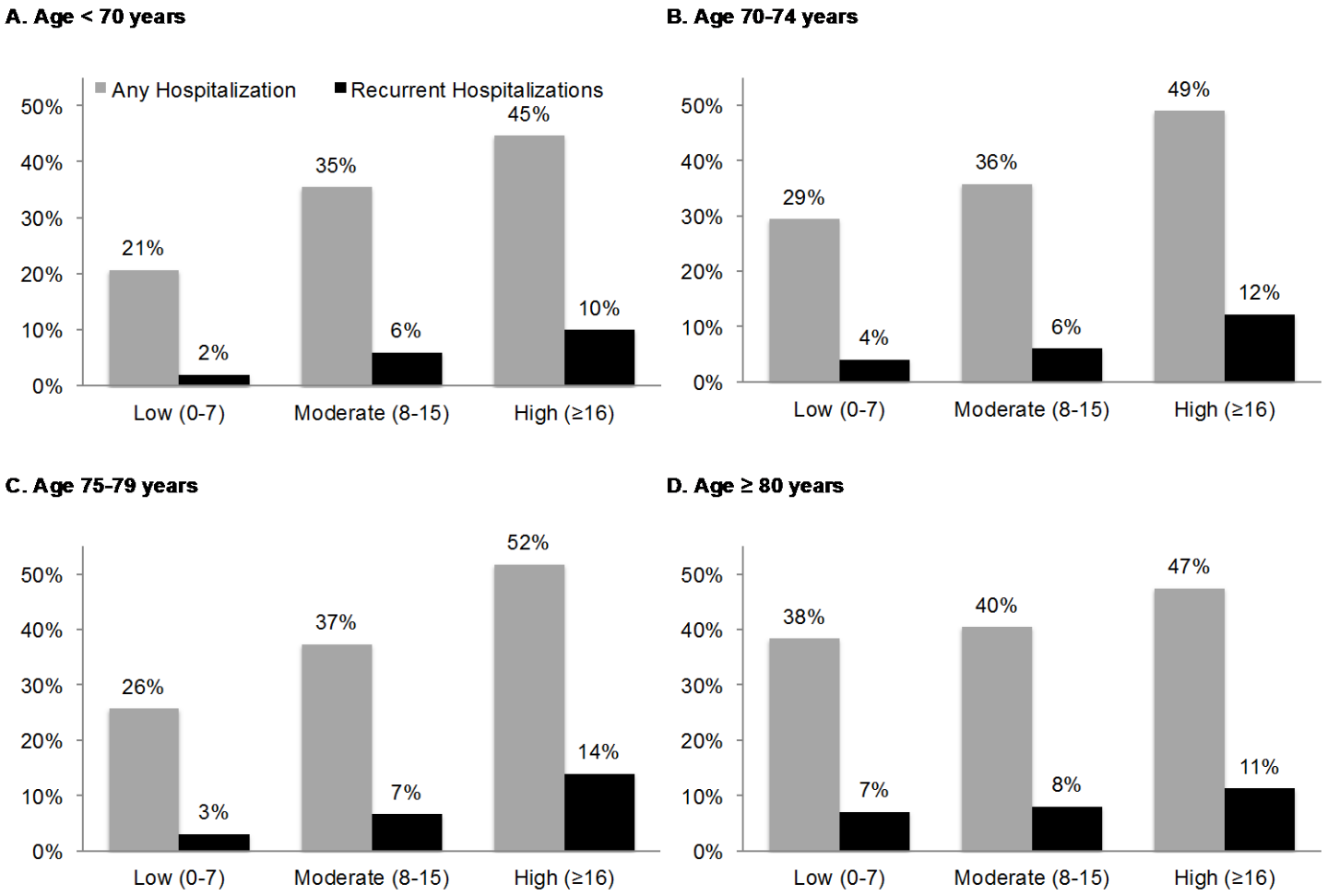
B. Validation Cohort (N = 4,177)



Goodness of Fit chi-square = 3.56, p=0.94

[a] The risk was estimated as the 5-year cumulative incidence of activity of daily living dependence from the cause-specific hazards model that accounted for competing risk.

Web Figure 2. Risk Category and 5-Year Risk of Hospitalization for Selected Conditions in the Validation Cohort, the Established Populations for Epidemiologic Studies of the Elderly, United States, 1981-1987 and 1985-1992[a]



[a] The 5-year risk of any or recurrent hospitalizations for selected conditions (myocardial infarction, stroke, cancer, and fracture) was plotted against the risk category in the validation cohort.

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