

Online Data Supplement

Six-Month Morbidity and Mortality among ICU Patients Receiving Life-Sustaining Therapy: A Prospective Cohort Study

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Table 1. Exclusion criteria

Patients less than 18 years of age

Patients for whom we could not obtain consent (e.g., unavailable surrogate, physician refusal)

Patients for whom we could not conduct long-term follow up (inability to speak English, home address unavailable)

Immediate plan to move to palliation or hospice

Incarcerated individuals

Prior enrollment in the study on earlier ICU admission

Neurosurgical and trauma patients

Table 2. Potential variables included in multivariable model building strategy, primary analysis

Demographics	Definition
Age	Age at time
Gender	Male or female
Education	Some college or higher
Insurance status	Private insurance
Employment/student status	Employed or a student just prior to critical illness
Marital status	Married or living with a partner
Race	White
Past health history	
Baseline walk up 10 stairs	Able to ambulate up 10 stairs without the assistance of another person
Baseline normal cognition	Able to remember most things, think clearly and solve day-to-day problems
Toileting independently	Able to go to the toilet room, clean oneself and arrange clothes without assistance (may use object for support such as cane, walker, or wheel chair and may manage night bedpan or commode, emptying the same morning).
Hospitalized in prior year	Patient admitted to hospital in the past 12 months
Functional comorbidity index	A 0-18 point scale based on comorbidities associated with impaired function. One point is assigned for the presence of each comorbidity. Presence of stroke or neuromuscular weakness
Neurological condition	On dialysis prior to critical illness
Renal failure	History of congestive heart failure
Congestive heart failure	History of coronary artery disease
Coronary artery disease	History of cancer which could be prior treatment or metastatic disease with palliation
Cancer	History of liver disease
Liver disease	BMI >30.0
Obesity	History of peripheral vascular disease
Peripheral vascular disease	ICU related health
ICU type	Medical ICU vs. surgical ICU
APACHE III	Severity of illness score used to predict in hospital mortality

Table 3. Patient outcomes compared to baseline function^a

Outcome	Normal Baseline	Abnormal Baseline	Unadjusted P value	Adjusted P value ^b
Survived Hospital	78.9 (161/204)	70.8 (68/96)	0.124	0.247
6 month survival	61.4 (124/202)	47.9 (45/94)	0.029	0.573
Return to original place of residence	55.0 (111/202)	30.9 (29/94)	<0.001	0.017
Ambulating 10 stairs independently ^c	83.6 (102/122)	37.2 (16/43)	<0.001	<0.0001
Toileting independently ^c	92.7 (114/123)	51.2 (22/43)	<0.001	<0.0001
Normal cognition ^c	68.0 (83/122)	46.5 (20/43)	0.012	0.104
Return to baseline	35.3 (71/201)	25.0 (23/92)	0.079	0.911

^aPresented as a percentage, raw numbers are presented in brackets.

^bAdjusted for age, race, hospitalization in the prior year, functional comorbidity index and APACHE III

^cPercent of patients is among survivors in each group.

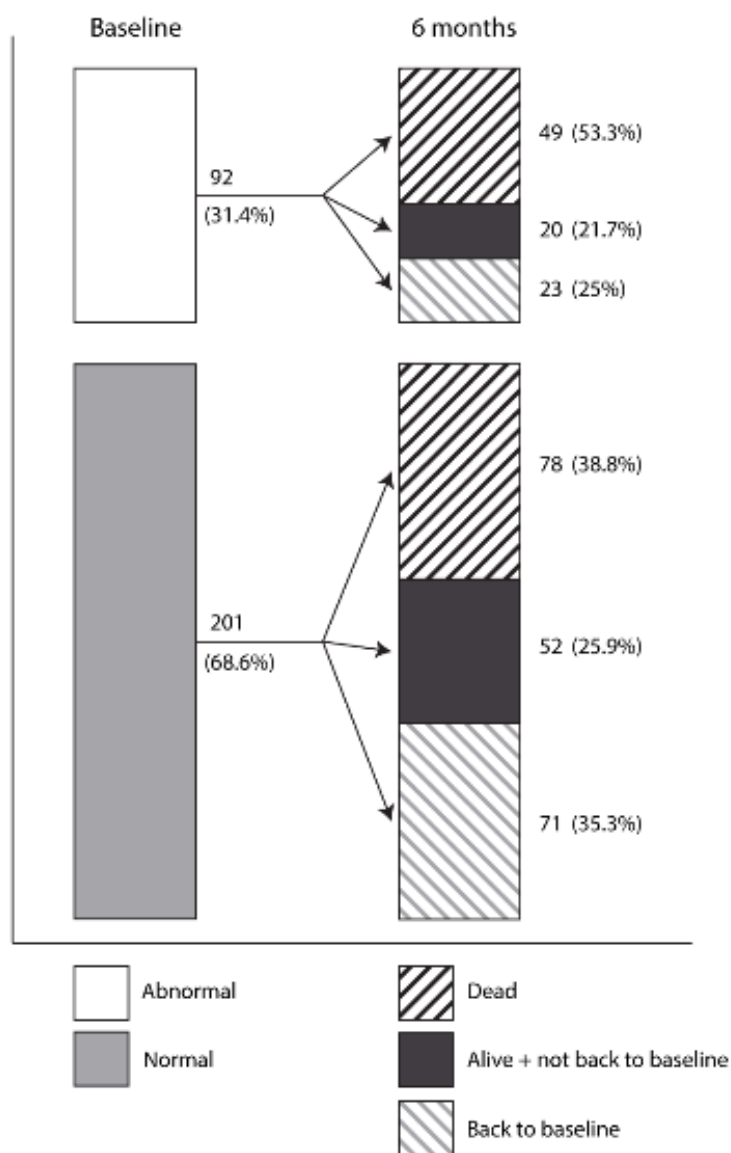
Table 4. Outcomes reported by patients and surrogates^a

Outcome	Patients	Surrogates	Unadjusted P Value	Adjusted P value ^b
Able to ambulating 10 stairs	81.7 (67/82)	61.4 (51/83)	0.005	0.015
Able to toilet	92.7 (76/82)	71.4 (60/84)	0.001	0.003
Normal cognition	72.0 (59/82)	53.0 (44/83)	0.013	0.048

^aPresented as a percentage, raw numbers for each category reported in brackets

^bAdjusted for age, race, hospitalization in the prior year, functional comorbidity index and APACHE III

Figure 1. Six month outcomes for patients who were
a. not normal at baseline b. normal at baseline^{a, b}



^a4 patients were lost to follow up, 3 had partial follow up and 3 had survivors had incomplete assessments of baseline function, thus complete assessments of baseline and six month function were available for 293 patients.

^b Normal baseline is at home and normal function with respect to ambulating 10 stairs, toileting and cognition. Abnormal baseline is one of the following, not from home or abnormal function in any of the following, ambulating 10 stairs, toileting or cognition.

Table 5. Unadjusted analyses of predictors of six-month return to baseline^a

	Not return to baseline (n=199)	Return to baseline (n=94)	P value
Age, median, IQR, years	63 (54-71)	59 (50-70)	0.06
Male gender, n, (%)	110 (55.3)	59 (62.8)	0.23
Education (minimum some college), n, (%)	92 (46.2)	53 (56.4)	0.11
Married (or living with a partner), n, (%)	99 (49.8)	48 (51.1)	0.83
Race (white), n, (%)	115 (57.8)	69 (73.4)	0.01
Insurance status (private), n, (%)	68 (34.2)	36 (38.3)	0.49
Employed or student prior to critical illness, n, (%)	50 (25.5)	37 (39.4)	0.02
Baseline function, n, (%):			
Walk up 10 stairs	159 (79.9)	79 (84.0)	0.40
Toilet	175 (87.9)	85 (90.4)	0.53
Normal cognition	164 (82.4)	79 (84.0)	0.73
Comorbidities, n, (%)			
Neurologic condition	43 (21.6)	12 (12.8)	0.07
Congestive heart failure	76 (38.2)	32 (34.0)	0.49
Coronary artery disease	66 (33.2)	36 (38.3)	0.39
COPD	41 (20.6)	21 (22.3)	0.73
Renal failure requiring dialysis	21 (10.6)	7 (7.5)	0.40
Liver disease	29 (14.6)	5 (5.3)	0.02
Peripheral vascular disease	44 (22.1)	15 (16.0)	0.22
Obesity	64 (32.2)	38 (40.4)	0.17
Cognitive impairment	13 (6.5)	4 (4.3)	0.44
Malignancy	73 (36.7)	21 (22.3)	0.014
Transplant history ^b	19 (9.6)	1 (1.0)	0.007
Number of comorbidities, n, (%)			
0	5 (2.5)	6 (6.4)	0.29
1	28 (14.1)	17(18.1)	
2	52 (26.1)	30 (31.9)	
3	48 (24.1)	17 (18.1)	
4	41 (20.6)	16 (17.0)	
≥5	25 (12.6)	8 (8.5)	
Hospitalized in the past year, n, (%)	150 (75.4)	54 (57.4)	0.004
APACHE III, median IQR	103 (82-125)	83 (66-109)	0.0001
MICU, n, (%)	139 (69.9)	42 (44.7)	0.0001
FCI median, IQR	4 (2-5)	3 (2-5)	0.41
3 day fluid balance ^c	4.22 (1.60-8.05)	3.87 (1.32-6.53)	0.30

Table 5 continued

NMBA ^d infusion, n, (%)	38 (19.1)	11 (11.7)	0.11
Analgesia infusion, n, (%)	144 (72.4)	60 (63.8)	0.14
Sedation infusion, n, (%)	124 (62.3)	66 (70.2)	0.19
Antipsychotics, n, (%)	83 (41.7)	32 (34.0)	0.21
Dialysis, n, (%)	52 (26.1)	10 (10.6)	0.002
ICU LOS median, IQR	9 (6-14)	7 (5-11)	0.003
Hospital LOS, median IQR	19 (11-29)	16 (10-25)	0.07
Goals of care made palliative in the ICU, n, (%)	71 (35.7)	1 (1.1)	<0.001
Discharged home, n, (%)	36 (18.1)	52 (55.3)	<0.001

^apresented as proportion with % in brackets or median with interquartile range in brackets

^bcombined lung, liver, kidney and bone marrow transplants

^cmeasured in liters

^d NMBA=neuromuscular blocking agent

Table 6. Predictors of six-month return to baseline restricted to patients' enrolled on days 3 and 4 (n=212)^a

Variable	Odds Ratio	95% CI
APACHE III ^b	0.82	0.73, 0.91
Race (non white)	0.33	0.15, 0.71
History of cancer	0.38	0.17, 0.82
Hospitalized in prior year	0.56	0.28, 1.15
Liver disease	0.45	0.13, 1.57
Neurologic disease	0.71	0.26, 1.93
Age	0.99	0.97, 1.01
Medical patient	0.47	0.23, 0.96

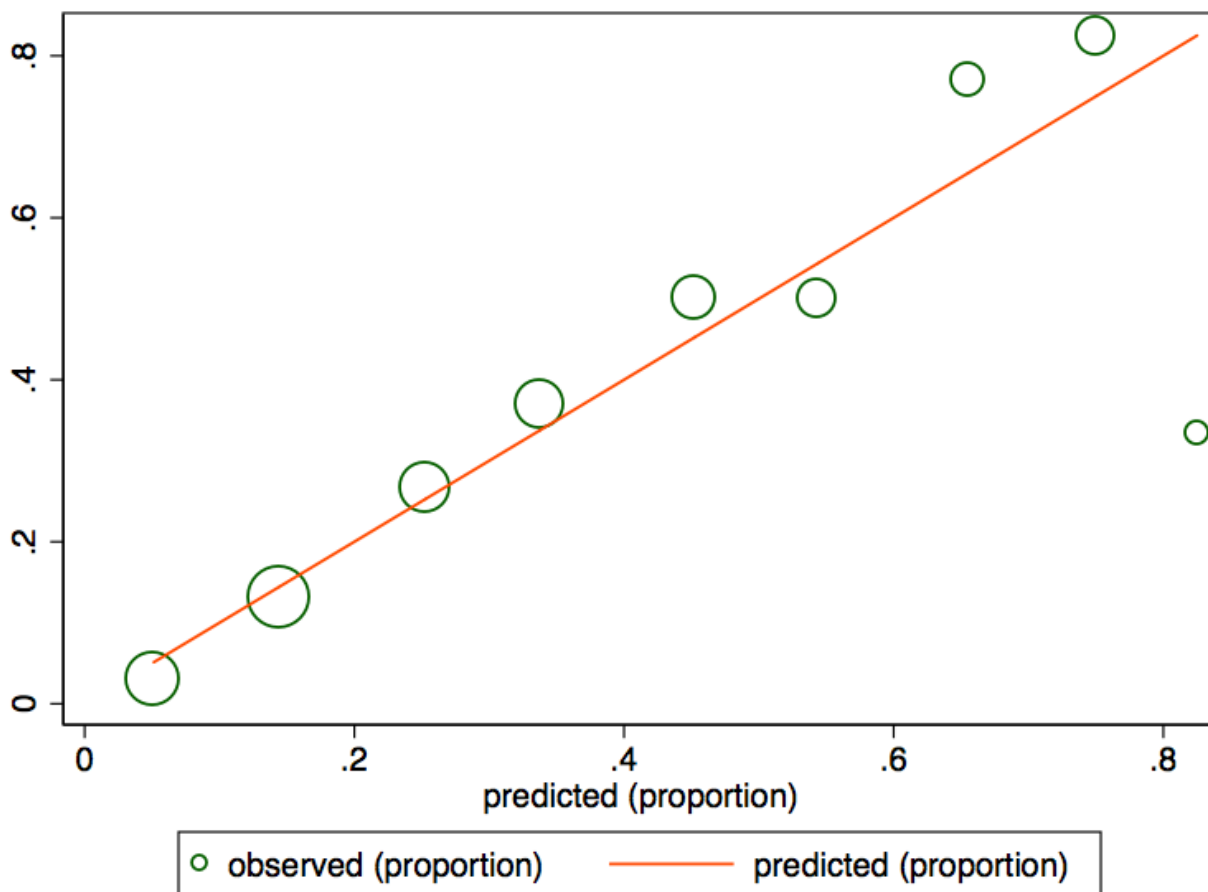
^aHistory of transplant was not in the model as no patients with a history of transplant returned to baseline in this model (n=16).

^bFor APACHE III score, this is represented as each 10-point increase.

Table 7. Predictors of six-month return to baseline restricted to variables available prior to ICU admission (n=293)

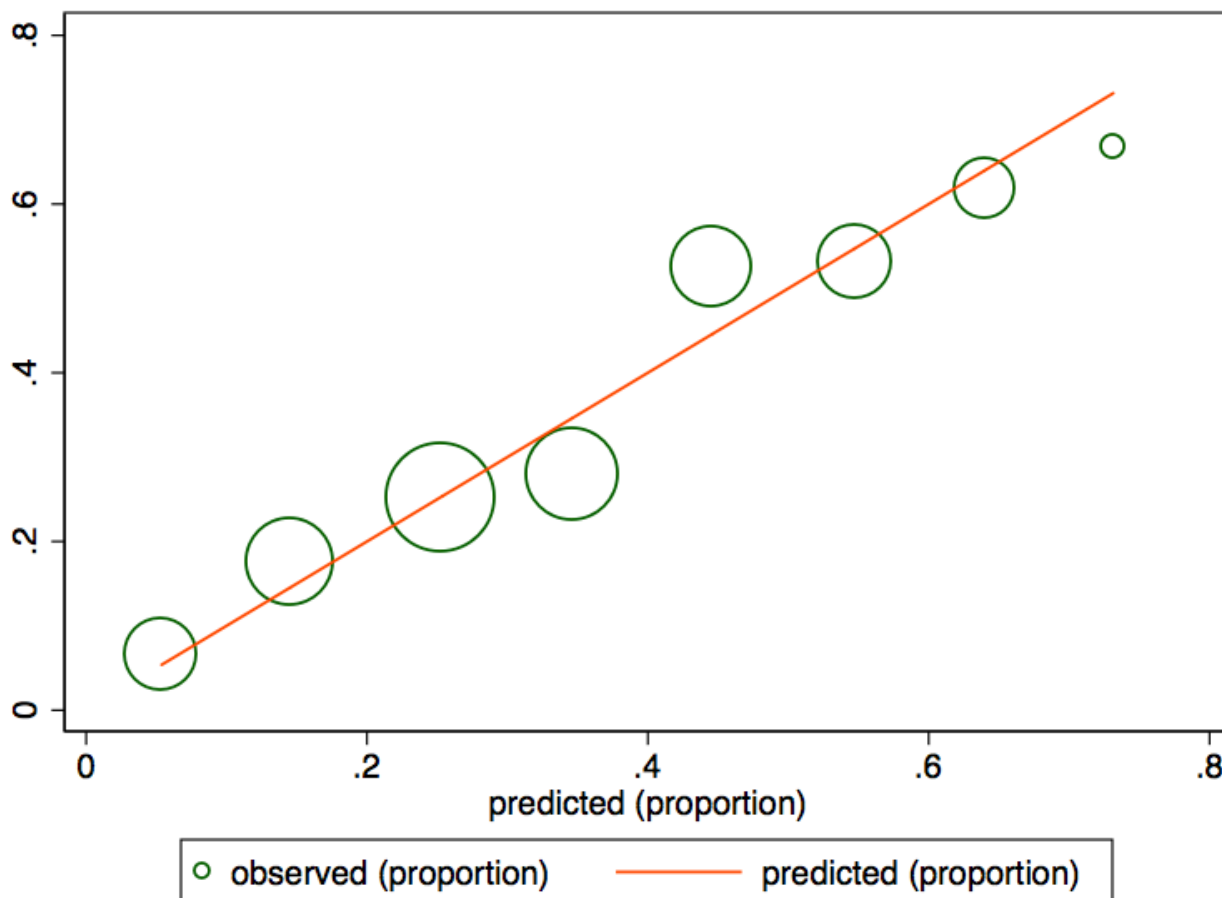
Variable	Odds Ratio	95% CI
History of cancer	0.42	0.23, 0.78
Race (non white)	0.41	0.22, 0.74
History of transplant ^c	0.11	0.01, 0.84
Age	0.98	0.97, 1.00
Hospitalized in prior year	0.58	0.33, 1.01
Neurological disease	0.47	0.22, 0.99
Liver disease	0.29	0.10, 0.82

Figure 2. Hosmer-Lemeshow plot and table comparing observed outcomes to predicted outcomes in model restricted to patients enrolled on days 3 and 4



Decile	Number of patients	Observed (%)	Expected (%)	Hosmer-Lemeshow
1	33	1 (3.0)	1.7 (9.4)	0.30
2	46	6 (13.0)	6.7 (14.5)	0.07
3	30	8 (26.7)	7.6 (25.3)	0.03
4	27	10 (37.0)	9.1 (33.8)	0.13
5	22	11 (50.0)	10.0 (45.2)	0.20
6	18	9 (50.0)	9.8 (54.4)	0.14
7	13	10 (76.9)	8.5 (65.5)	0.75
8	17	14 (82.4)	12.8 (75.0)	0.49
9	6	2 (33.3)	4.9 (82.5)	10.04
Total	212	71 (33.5)	71.0 (33.5)	12.16

Figure 3. Hosmer-Lemeshow plot and table comparing observed outcomes to predicted outcomes in model restricted to variables available prior to ICU admission



Decile	Number of patients	Observed (%)	Expected (%)	Hosmer-Lemeshow
1	31	2 (6.5)	1.7 (5.4)	0.07
2	46	8 (17.4)	6.7 (14.5)	0.30
3	72	18 (25.0)	18.3 (25.4)	0.01
4	50	14 (28.0)	17.3 (34.6)	0.96
5	38	20 (52.6)	16.9 (44.6)	0.99
6	32	17 (53.1)	17.5 (54.7)	0.03
7	21	13 (61.9)	13.4 (64.0)	0.04
8	3	2 (66.7)	2.2 (73.1)	0.06
Total	293	94 (32.1)	94 (32.1)	2.46