

Supplement 4. Results of Multilevel Analyses of Model B Predicting Health Outcomes

Model B	Length of stay ^{†,‡} (n=70,136)			Readmission within 30 days (n=65,433) ^{††}		Psychiatric emergency treatment (n=70,136)		Use of injected psycholeptics [‡] (n=70,136)			Hypnotics use ^{†,‡} (n=70,136)		
	Estimate	SE	p	OR	95% CI	OR	95% CI	Estimate	SE	p	Estimate	SE	p
Patient characteristics													
Age	0.00	0.00	<.001	0.99***	0.99~0.99	0.99***	0.98~0.99	-0.01	0.00	<.001	0.00 [¶]	0.00	<.001
Sex (ref. male)	-0.04	0.01	<.001	0.89***	0.85~0.93	0.94**	0.89~0.98	0.05	0.01	<.001	-0.01	0.00	.027
Insurance (ref. medical aid)	-0.41	0.01	<.001	0.65***	0.62~0.68	1.59***	1.51~1.68	0.10	0.01	<.001	-0.07	0.00	<.001
Diagnosis (ref. F10.x)													
F2.x	0.49	0.01	<.001	0.92**	0.87~0.97	0.73***	0.68~0.77	-0.25	0.01	<.001	-0.07	0.00	<.001
F3.x	0.09	0.01	<.001	0.79***	0.74~0.84	0.69***	0.64~0.73	-0.23	0.01	<.001	-0.02	0.00	<.001
Previous psychiatric hospitalization within the last year (ref. no)	0.41	0.01	<.001	2.74***	2.62~2.86	0.75***	0.71~0.78	-0.13	0.01	<.001	0.02	0.00	<.001
Number of psychiatric sub-diagnoses	0.17	0.00	<.001	1.01	0.99~1.03	1.13***	1.10~1.15	0.11	0.00	<.001	0.02	0.00	<.001
Number of physical sub-diagnoses	0.15	0.00	<.001	0.99	0.98~1.00	1.06***	1.05~1.08	0.04	0.00	<.001	0.00 [¶]	0.00	<.001
ECM score for the last year	-0.05	0.00	<.001	1.03***	1.02~1.04	0.97***	0.96~0.98	0.00 [¶]	0.00	.143	0.01	0.00	<.001
Length of stay ≥30 (ref. <30)	-	-	-	0.92***	0.88~0.96	1.47***	1.40~1.54	0.22	0.01	<.001	-0.03	0.00	<.001
Insomnia sub-diagnosis (ref. no)	-	-	-	-	-	-	-	-	-	-	0.52	0.00	<.001
System characteristics													
Types of hospitals (ref. tertiary)													
General	0.01	0.11	.958	1.14	0.88~1.49	0.93	0.27~3.14	-0.15	0.10	.155	0.05	0.05	.400
Hospital	0.30	0.13	.019	1.59**	1.17~2.16	1.48	0.34~6.47	-0.21	0.12	.091	0.03	0.06	.692
Psychiatric	0.40	0.13	.001	1.60**	1.18~2.17	1.63	0.37~7.20	-0.20	0.13	.105	0.01	0.06	.846
Clinic	0.26	0.15	.087	1.69**	1.17~2.44	1.12	0.19~6.70	-0.41	0.15	.006	-0.01	0.08	.940
Number of total beds	0.00	0.00	.665	1.00	1.00~1.00	1.00	1.00~1.00	0.00	0.00	.949	0.00	0.00	.995
Ownership (ref. private)	0.11	0.07	.102	0.98	0.83~1.16	0.74	0.33~1.67	-0.20	0.07	.003	0.01	0.04	.763
Teaching (ref. no)	0.02	0.07	.779	0.78**	0.66~0.92	0.86	0.39~1.88	0.11	0.07	.112	-0.05	0.03	.155
Location (ref. Seoul)													
Other metropolitan	-0.10	0.07	.143	1.08	0.93~1.26	0.69	0.32~1.49	0.20	0.06	.001	0.13	0.03	<.001
Province	-0.04	0.06	.510	1.03	0.89~1.19	0.60	0.29~1.24	0.05	0.06	.367	0.01	0.03	.804
Bed occupancy rate	0.00 [¶]	0.00	.088	1.00	1.00~1.00	1.00	0.99~1.01	0.00 [¶]	0.00	.870	0.00 [¶]	0.00	.292
System behaviors													
Nurse staffing													
RN-to-adj. inpatient ratio	0.01	0.00	.011	1.01*	1.00~1.02	0.96*	0.92~1.00	0.00	0.00	.413	0.00	0.00	.048

Adj.=Adjusted; CI=Confidence interval; ECM=Elixhauser comorbidity measures; F10.x=Mental and behavioral disorders due to use of alcohol; F2.x=Schizophrenia, schizotypal and delusional disorders; F3.x=Mood disorders; Model B includes RN-to-adjusted inpatient ratio as the nurse staffing variable; OR=Odds ratio; ref.=Reference; RN=Registered nurse; SE=Standard error.

[†]Log transformation; ^{††}Excluded patients who were discharged between December 2 to 31, 2016, due to unavailability of fully traceable readmissions within 30 days after discharge; [¶]Values of 0.00 are not exactly equal to zero; ^{||}Values are lower than 0.00.

* $p < .05$; ** $p < .01$; *** $p < .001$.