

Supplement 3. Results of Multilevel Analyses of Model A Predicting Health Outcomes

Model A	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	ρ	OR	95% CI	OR	95% CI	Estimate	SE	ρ	Estimate	SE	ρ
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	0.93**	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	0.91***	0.86~0.96	0.73***	0.68~0.77	-0.25	0.01	<.001	-0.07	0.00	<.001
F3.x	0.10	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	2.75***	2.63~2.87	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	0.143	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	0.10	.890	1.14	0.88~1.48	0.89	0.26~3.05	-0.15	0.10	.144	0.05	0.05	.380
Hospital	0.20	0.13	.106	1.61**	1.18~2.19	1.41	0.31~6.35	-0.23	0.13	.069	0.03	0.07	.629
Psychiatric	0.31	0.13	.015	1.63**	1.19~2.22	1.56	0.34~7.11	-0.22	0.13	.080	0.02	0.07	.789
Clinic	0.19	0.15	.197	1.71**	1.19~2.46	0.88	0.15~5.22	-0.42	0.15	.004	0.02	0.08	.841
Number of total beds	0.00	0.00	.615	1.00	1.00~1.00	1.00	1.00~1.00	0.00	0.00	.944	0.00	0.00	.937
Ownership (ref. private)	0.12	0.07	.071	1.02	0.86~1.21	0.76	0.34~1.71	-0.20	0.07	.003	0.01	0.04	.789
Teaching (ref. no)	0.05	0.07	.462	0.79**	0.67~0.93	0.88	0.40~1.93	0.11	0.07	.095	-0.05	0.03	.129
Location (ref. Seoul)													
Other metropolitan	-0.10	0.06	.106	1.05	0.90~1.23	0.68	0.31~1.46	0.20	0.06	.001	0.13	0.03	<.001
Province	-0.06	0.06	.319	1.00	0.87~1.16	0.59	0.28~1.21	0.05	0.06	.404	0.01	0.03	.747
Bed occupancy rate	0.00	0.00	.069	1.00	1.00~1.01	1.00	0.98~1.01	0.00	0.00	.877	0.00	0.00	.404
System behaviors													
Nurse staffing													
RN-to-inpatient ratio	0.02	0.00	<.001	1.01*	1.00~1.02	0.97	0.93~1.02	0.00	0.00	.244	0.00	0.00	.212

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 A includes RN-to-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.

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