

Appendix

Table A.1
Hosmer-Lemeshow Goodness-of-Fit (C test) - Original models

MPM II

Predicted Mortality Within Decile (%)	# of Admissions	Observed Deaths	Expected Deaths	Observed Survivors	Expected Survivors	H-L Statistic
0.007 - 0.034	466	2	10.3	464	455.7	6.88
0.034 - 0.052	461	17	19.7	444	441.3	0.39
0.052 - 0.073	454	27	28.3	427	425.7	0.07
0.073 - 0.100	478	24	41.5	454	436.5	8.07
0.100 - 0.127	450	35	51.4	415	398.6	5.89
0.127 - 0.154	469	53	65.8	416	403.2	2.90
0.154 - 0.202	465	66	82.1	399	382.9	3.83
0.203 - 0.287	461	93	111.2	368	349.8	3.94
0.288 - 0.445	463	138	162.5	325	300.5	5.70
0.445 - 0.968	463	255	287.9	208	175.1	9.94
Total	4630	710	860.8	3920	3769.2	47.61

C= 47.61 *df* 10, *p* < 0.0001

SAPS II

Predicted Mortality Within Decile (%)	# of Admissions	Observed Deaths	Expected Deaths	Observed Survivors	Expected Survivors	H-L Statistic
0.000 - 0.017	478	4	4.9	474	473.1	0.18
0.020 - 0.033	470	9	12.3	461	457.7	0.89
0.037 - 0.047	428	12	17.6	416	410.4	1.84
0.052 - 0.072	519	16	32.4	503	486.6	8.84
0.079 - 0.106	467	21	43.2	446	423.8	12.53
0.117 - 0.153	444	32	59.0	412	385.0	14.28
0.167 - 0.230	435	53	84.7	382	350.3	14.70
0.247 - 0.370	438	78	130.5	360	307.5	30.12
0.392 - 0.661	497	183	253.7	314	243.3	40.23
0.681 - 0.997	454	302	379.4	152	74.6	96.21
Total	4630	710	1017.7	3920	3612.3	219.83

C= 219.83 *df* 10, *p* < 0.0001

Table A.1 (continued)
Hosmer-Lemeshow Goodness-of-Fit (C test) – Original models

APACHE II

Predicted Mortality Within Decile (%)	# of Admissions	Observed Deaths	Expected Deaths	Observed Survivors	Expected Survivors	H-L Statistic
0.001 - 0.033	468	2	8.9	466	459.1	5.46
0.033 - 0.056	457	9	20.4	448	436.6	6.63
0.056 - 0.081	463	16	31.0	447	432.0	7.74
0.081 - 0.109	465	13	43.9	452	421.1	24.05
0.110 - 0.146	467	32	59.5	435	407.5	14.54
0.146 - 0.201	456	47	78.5	409	377.5	15.24
0.201 - 0.263	462	62	106.2	400	355.8	23.87
0.265 - 0.387	468	85	148.5	383	319.5	39.75
0.389 - 0.577	463	165	220.7	298	242.3	26.84
0.577 - 0.996	461	279	342.1	182	118.9	45.09
Total	4630	710	1059.5	3920	3570.5	209.20

C= 209.20 *df* 10, *p* < 0.0001

APACHE III

Predicted Mortality Within Decile (%)	# of Admissions	Observed Deaths	Expected Deaths	Observed Survivors	Expected Survivors	H-L Statistic
0.000 - 0.009	463	2	2.4	461	460.6	0.07
0.009 - 0.017	463	5	5.8	458	457.2	0.11
0.017 - 0.030	463	8	10.7	455	452.3	0.69
0.030 - 0.048	463	11	17.7	452	445.3	2.61
0.048 - 0.074	463	28	27.5	435	435.5	0.01
0.074 - 0.117	463	34	43.7	429	419.3	2.36
0.117 - 0.186	463	45	68.8	418	394.2	9.69
0.186 - 0.315	463	86	111.1	377	351.9	7.48
0.315 - 0.571	463	166	198.2	297	264.8	9.13
0.571 - 0.997	463	325	353.8	138	109.2	9.96
Total	4630	710	839.7	3920	3790.3	42.11

C= 42.11 *df* 10, *p* < 0.0001

Table A.2
Hosmer-Lemeshow Goodness-of-Fit (H test) – Original models

MPM II

Predicted Mortality Within Decile (%)	# of Admissions	Observed Deaths	Expected Deaths	Observed Survivors	Expected Survivors	H-L Statistic
0.007 - 0.100	1859	70	99.9	1789	1759.1	9.46
0.100 - 0.200	1348	149	192.0	1199	1156.0	11.24
0.200 - 0.300	555	115	135.5	440	419.5	4.10
0.301 - 0.400	323	97	110.9	226	212.1	2.65
0.400 - 0.499	185	58	83.0	127	102.0	13.64
0.500 - 0.598	131	70	71.7	61	59.3	0.09
0.600 - 0.694	103	58	66.4	45	36.6	3.02
0.701 - 0.800	65	48	48.6	17	16.4	0.03
0.803 - 0.896	48	34	40.7	14	7.3	7.29
0.904 - 0.968	13	11	12.1	2	0.9	1.59
Total	4630	710	860.8	3920	3769.2	53.10

H= 53.10 df 10, p < 0.0001

SAPS II

Predicted Mortality Within Decile (%)	# of Admissions	Observed Deaths	Expected Deaths	Observed Survivors	Expected Survivors	H-L Statistic
0.000 - 0.097	2259	57	99.3	2202	2159.7	18.88
0.106 - 0.196	835	66	122.2	769	712.8	30.26
0.213 - 0.285	375	60	92.7	315	282.3	15.31
0.306 - 0.392	266	57	92.3	209	173.7	20.65
0.415 - 0.484	185	51	82.6	134	102.4	21.81
0.507 - 0.598	167	69	92.3	98	74.7	13.16
0.619 - 0.681	108	59	69.8	49	38.2	4.72
0.700 - 0.799	163	84	121.8	79	41.2	46.39
0.813 - 0.897	145	95	124.0	50	21.0	46.98
0.905 - 0.997	127	112	120.7	15	6.3	12.51
Total	4630	710	1017.7	3920	3612.3	230.67

H= 230.67 df 10, p < 0.0001

Table A.2 (continued)
Hosmer-Lemeshow Goodness-of-Fit (H test) – Original models

APACHE II

Predicted Mortality Within Decile (%)	# of Admissions	Observed Deaths	Expected Deaths	Observed Survivors	Expected Survivors	H-L Statistic
0.001 - 0.099	1720	36	90.0	1684	1630.0	34.21
0.100 - 0.199	1052	82	151.2	970	900.8	37.03
0.201 - 0.300	650	95	159.0	555	491.0	34.08
0.300 - 0.399	323	62	111.8	261	211.2	33.96
0.402 - 0.498	267	88	120.3	179	146.7	15.79
0.500 - 0.598	192	80	105.6	112	86.4	13.80
0.602 - 0.699	161	73	103.9	88	57.1	25.95
0.700 - 0.798	101	66	75.3	35	25.7	4.49
0.801 - 0.898	120	91	101.0	29	19.0	6.29
0.902 - 0.996	44	37	41.3	7	2.7	7.10
Total	4630	710	1059.5	3920	3570.5	212.70

H= 212.70 df 10, p < 0.0001

APACHE III

Predicted Mortality Within Decile (%)	# of Admissions	Observed Deaths	Expected Deaths	Observed Survivors	Expected Survivors	H-L Statistic
0.000 - 0.100	2608	68	89.3	2540	2518.7	5.28
0.100 - 0.200	701	78	100.3	623	600.7	5.80
0.200 - 0.299	360	64	87.3	296	272.7	8.18
0.300 - 0.400	234	65	81.5	169	152.5	5.12
0.400 - 0.499	162	60	72.7	102	89.3	4.05
0.500 - 0.598	147	73	81.1	74	65.9	1.79
0.601 - 0.699	125	72	80.8	53	44.2	2.72
0.700 - 0.800	110	78	82.9	32	27.1	1.16
0.801 - 0.900	100	75	85.0	25	15.0	7.87
0.901 - 0.997	83	77	78.8	6	4.2	0.77
Total	4630	710	839.7	3920	3790.3	42.74

H= 42.74 df 10, p < 0.0001

Table A.3
MPM₀ II variables and re-estimated coefficients (all 3 splits)

Variable	Original	Re-estimated Model			
		Split #1	Split #2	Split #3	
Intercept	-5.468	-6.012	-6.081	-6.017	*
Coma or deep stupor	1.486	1.576	1.458	1.543	*
Heart Rate \geq 150 beats/min	0.456	0.980	1.211	0.990	*
Systolic blood pressure \leq 90 mmHg	1.061	0.893	0.919	0.772	*
Chronic renal insufficiency	0.919	0.892	0.816	0.816	*
Cirrhosis	1.137	0.963	1.175	1.054	*
Metastatic neoplasm	1.200	1.119	1.387	0.996	*
Acute renal failure	1.482	1.071	0.745	1.016	*
Cardiac dysrhythmia	0.281	-0.732	-0.626	-0.467	1,2
Cerebrovascular accident	0.213	0.601	0.597	0.491	1,2
GI bleeding	0.397	-0.218	-0.115	-0.516	NS
Intracranial mass effect	0.865	0.688	0.534	0.653	*
CPR prior to admission	0.570	1.279	1.396	1.481	*
Mechanical ventilation	0.791	0.674	0.591	0.666	*
Non-elective Surgery	1.191	1.100	1.257	1.210	*
Age	0.031	0.037	0.038	0.037	*

* = P value < 0.05 in all three splits
1 = P value < 0.05 in Split #1
2 = P value < 0.05 in Split #2

Table A.4
SAPS II variables and re-estimated coefficients (all 3 splits)

Variable	Original	Re-estimated Model			
		Split #1	Split #2	Split #3	
Intercept	-7.763	-7.558	-7.050	-8.987	*
SAPS II Score	0.074	0.067	0.075	0.062	*
LOG SAPS II Score	0.997	0.842	0.632	1.280	NS

* = P value < 0.05 in all three splits

Table A.5
APACHE II variables and re-estimated coefficients (all 3 splits)

Variables	Original	Re-estimated Model (1)†				Re-estimated Model (2)‡			
		Split #1	Split #2	Split #3		Split #1	Split #2	Split #3	
Intercept	-3.517	-4.847	-4.905	-4.878	*	-4.724	-4.784	-4.713	*
APACHE II score	0.146	0.172	0.175	0.174	*	0.171	0.173	0.172	*
Emergency surgery	0.603	0.500	0.514	0.481	NS	0.848	0.869	0.807	*
Diagnostic categories§	n/a	0.475	0.492	0.514	*	-	-	-	
Coronary artery disease	-0.191	-	-	-		0.012	-0.042	-0.095	NS
Metabolic/renal/hematologic non-operative	-0.885	-	-	-		-0.595	-0.523	-0.632	*
Rhythm disturbance	-1.368	-	-	-		-0.675	-0.504	-0.570	1,3
Congestive heart failure	-0.424	-	-	-		-0.549	-0.484	-0.645	1,3
GI bleeding	0.334	-	-	-		-0.514	-0.216	-0.347	NS
Neurologic non-operative	-0.759	-	-	-		0.153	0.212	0.195	NS
ICH/SDH/SAH	0.723	-	-	-		0.834	0.667	0.662	*
COPD	-0.367	-	-	-		-0.379	-0.205	-0.260	NS
Sepsis	0.113	-	-	-		-0.060	0.009	-0.155	NS
Cardiovascular post-operative	-0.797	-	-	-		-0.870	-0.755	-0.916	3
Pulmonary edema (non-cardiogenic)	-0.251	-	-	-		-0.748	-0.462	-0.456	1
Drug overdose	-3.353	-	-	-		-1.594	-1.933	-1.869	*
Cardiovascular non-operative	0.47	-	-	-		-0.237	-0.273	-0.351	NS
Metabolic/renal/hematologic post-operative	-0.196	-	-	-		-2.346	-2.436	-2.546	*
Gastrointestinal non-operative	0.501	-	-	-		-0.008	0.234	0.141	NS
Craniotomy for neoplasm	-1.245	-	-	-		-1.073	-1.295	-1.523	3
Respiratory non-operative	-0.89	-	-	-		0.430	0.330	0.308	NS
Thoracic surgery for neoplasm	-0.802	-	-	-		-0.761	-0.577	-0.713	NS
GI perforation/obstruction	0.06	-	-	-		-0.603	-0.511	-0.336	NS
Hemorrhagic shock/hypovolemia	0.493	-	-	-		-1.130	-0.440	-0.520	NS
Gastrointestinal post-operative	-0.613	-	-	-		-0.608	-0.505	-0.445	NS
Peripheral vascular surgery	-1.315	-	-	-		-0.224	-0.809	-1.019	NS
GI surgery for neoplasm	-0.248	-	-	-		-0.076	-0.517	-0.720	NS
Other diagnoses	n/a	-	-	-		1.101	1.137	1.234	*

* = P value < 0.05 in all three splits

1 = P value < 0.05 in Split #1

3 = P value < 0.05 in Split #3

† = Diagnostic category coefficients were NOT re-estimated

‡ = Diagnostic category coefficients were re-estimated

§ = Relative contribution of the diagnostic categories as a whole in predicting mortality compared to the other variables in the risk equation

|| = Diagnostic categories with insufficient patients to generate a coefficient were combined into a single category

Table A.6
APACHE III variables and re-estimated coefficients (all 3 splits)

Variable		Original	Re-estimated Model (1)†			Re-estimated Model (2)‡				
			Split #1	Split #2	Split #3	Split #1	Split #2	Split #3		
Intercept:		-6.413	-5.874	-5.994	-5.100	*	-5.844	-5.891	-5.080	*
Age:	45-54	0.342	0.181	-0.185	-0.089	NS	0.187	-0.203	-0.105	NS
	55-59	0.321	0.632	0.329	0.422	1	0.685	0.344	0.451	1
	60-64	0.613	0.646	0.613	0.266	1,2	0.672	0.630	0.292	1,2
	65-69	0.757	0.750	0.450	0.623	1,3	0.783	0.459	0.624	1,3
	70-74	1.006	1.215	0.911	1.123	*	1.248	0.912	1.135	*
	75-84	1.127	1.221	1.081	1.097	*	1.276	1.093	1.116	*
	≥85	1.495	1.543	1.235	1.166	*	1.576	1.243	1.180	*
Past Medical History:	AIDS	1.024	-1.081	-1.654	-1.340	NS	-1.154	-1.670	-1.320	NS
	Hepatic failure	1.13	0.189	0.274	0.959	3	0.134	0.205	0.943	NS
	Lymphoma	1.005	1.386	1.331	1.589	*	1.359	1.359	1.579	*
	Metastatic cancer	0.886	0.561	0.872	0.292	2	0.583	0.869	0.323	1,2
	Leukemia/multiple myeloma	0.756	0.274	0.824	-0.026	NS	0.259	0.761	-0.055	NS
	Immunosuppression	0.321	0.714	0.249	-0.455	NS	0.741	0.258	-0.451	NS
	Cirrhosis	0.860	0.735	0.698	0.124	2	0.674	0.655	0.131	NS
Acute Physiology Score:	APS	0.088	0.046	0.065	0.022	1,2	0.048	0.065	0.023	2
	APS3ALL1	-0.309	0.265	0.077	0.579	3	0.255	0.075	0.568	NS
	APS3ALL2	0.513	-0.545	-0.248	-1.133	3	-0.533	-0.240	-1.112	3
	APS3ALL3	-0.353	0.492	0.377	1.007	3	0.500	0.359	0.984	3
	APS3ALL4	0.451	-0.363		-0.762	NS	-0.402	-0.163	-0.724	NS
Location:	Admitted to ICU from floor	0.048	0.272	0.133	0.211	NS	0.306	0.154	0.237	NS
	Transfer	0.206	0.621	0.805	0.841	2,3	0.592	0.824	0.869	2,3
	Admit to ICU from OR	-0.238	0.004	-0.309	-0.471	NS	-0.162	-0.406	-0.561	NS
Other:	Emergency surgery	0.079	0.337	0.232	1.021	3	0.359	0.216	1.021	3
	Pre-ICU LOS (days)	0.141	0.112	0.165	0.159	*	0.111	0.162	0.160	*
	Excess hospital LOS	0.069	0.101	0.093	0.066	1	0.098	0.091	0.062	NS
Diagnosis:	Diagnostic categories§	n/a	0.869	0.736	0.874	*	-	-	-	
	Acute myocardial infarction	0.678	-	-	-		0.438	0.082	0.466	NS
	Respiratory medical other	0.220	-	-	-		-0.173	-0.171	-0.298	NS
	Pneumonia, bacterial	0.357	-	-	-		0.126	0.333	0.251	NS
	Rhythm disturbance	-0.236	-	-	-		-0.465	-0.308	-0.075	NS
	Cardiovascular medical other	-0.292	-	-	-		-0.627	-0.392	-0.555	NS
	COPD	0.438	-	-	-		-0.013	0.181	0.195	NS
	Sepsis	0.354	-	-	-		-0.065	-0.175	0.037	NS
	Drug intoxication / overdose	-1.528	-	-	-		-0.954	-1.850	-1.544	2
	Intracranial hemorrhage	1.521	-	-	-		1.412	1.190	1.450	*
	Diabetic ketoacidosis	-1.920	-	-	-		-2.482	-0.787	-1.504	1,3
	Other diagnoses	n/a	-	-	-		0.728	0.754	0.823	*

* = P value < 0.05 in all three splits
1 = P value < 0.05 in Split #1
2 = P value < 0.05 in Split #2
3 = P value < 0.05 in Split #3

† = Diagnostic category coefficients were NOT re-estimated
‡ = Diagnostic category coefficients were re-estimated
§ = Relative contribution of the diagnostic categories as a whole in predicting mortality compared to the other variables in the risk equation
|| = Diagnostic categories with insufficient patients to generate a coefficient were combined into a single category