

Risk modelling for quality improvement in the critically ill: making best use of available data

Supplementary material

Table S1 Explained variation for cause-specific model

	R ²	95% CI*
Final model	0.985	(0.982, 0.987)
Predictors dropped:		
Highest heart rate	0.985	(0.983, 0.987)
Lowest respiratory rate	0.985	(0.983, 0.988)
Age	0.982	(0.980, 0.986)
Lowest arterial pH	0.982	(0.980, 0.985)
Lowest white blood cell count	0.982	(0.976, 0.986)
PaCO ₂	0.982	(0.980, 0.985)
Urine output	0.982	(0.976, 0.985)
Lowest systolic blood pressure	0.978	(0.976, 0.982)
Highest sodium	0.978	(0.976, 0.982)
Highest creatinine	0.950	(0.942, 0.959)
Highest urea	0.826	(0.808, 0.850)
Highest blood lactate	0.808	(0.788, 0.833)
Mechanical ventilation	0.806	(0.791, 0.832)
Male gender	0.804	(0.783, 0.832)
Ethnicity	0.791	(0.771, 0.819)
Pregnant/recently pregnant	0.790	(0.768, 0.812)
Severe liver disease	0.790	(0.764, 0.814)
Metastatic disease	0.786	(0.768, 0.812)
Peripheral vascular disease	0.785	(0.765, 0.805)
Diabetes	0.779	(0.756, 0.804)
CKD (5 years look back)	0.572	(0.539, 0.622)
AKI (5 years look back)	0.522	(0.487, 0.570)
Surgical status	0.374	(0.338, 0.436)
Critical care unit length of stay	0.373	(0.341, 0.431)
Hospital length of stay after discharge from critical care	0.370	(0.320, 0.428)
Sepsis	0.369	(0.341, 0.433)
Trauma	0.340	(0.309, 0.394)
Nephrectomy	0.328	(0.284, 0.390)
Vascular surgery	0.327	(0.291, 0.399)
Duration of renal support	0.001	(0.000, 0.003)
Duration of advanced respiratory support	0.001	(0.000, 0.002)
Duration of basic/advanced cardiovascular support	0	0

* Confidence intervals were calculated by using 100 bootstrap replicates

Table S2 Contribution to the model of predictors for ROSC > 20 minutes, hospital survival and one year survival following in-hospital cardiac arrest

Predictor	df	LL	p-value for Likelihood-ratio test	BIC	Difference in BIC*	c index*	Brier's score*
ROSC > 20 minutes							
Full model	31	-16414		33145		0.712	0.214
Age	27	-16520	<0.0001		170.487	0.706	0.216
Sex	30	-16419	0.0024		0.998	0.705	0.216
Prior length of stay	28	-16436	<0.0001		12.700	0.712	0.214
Reason for attendance	25	-16463	<0.0001		35.095	0.711	0.215
Location of arrest	23	-16632	<0.0001		354.325	0.710	0.215
Presenting rhythm	24	-17479	<0.0001		2058.272	0.712	0.214
Full model after adding interaction between location of arrest and presenting rhythm	46	-16263		32995		0.718	0.212
Hospital survival							
Full model	30	-10430		21166		0.810	0.122
Age	26	-10718	<0.0001		535.029	0.796	0.126
Prior length of stay	27	-10471	<0.0001		50.483	0.809	0.123
Reason for attendance	24	-10598	<0.0001		275.063	0.801	0.125
Location of arrest	22	-10756	<0.0001		570.816	0.788	0.127
Presenting rhythm	23	-11618	<0.0001		2305.143	0.738	0.138
Full model after adding interaction between location of arrest and presenting rhythm	45	-10268		20996		0.816	0.121
One-year survival							
Full model	45	-9034		18528.7		0.823	0.103
Age	41	-9364	<0.0001		618.975	0.803	0.107
Prior length of stay	42	-9087	<0.0001		73.882	0.821	0.104
Reason for attendance	39	-9178	<0.0001		226.660	0.815	0.105
Interaction between location of arrest and presenting rhythm	22	-9980	<0.0001		1655.957	0.766	0.115
Location of arrest	19	-10101	<0.0001		212.575	0.752	0.117
Presenting rhythm	18	-10414	<0.0001		827.578	0.728	0.120

* When predictor removed

Figure S1 Kaplan-Meier survival curve for critical care survivors: severe comorbidities

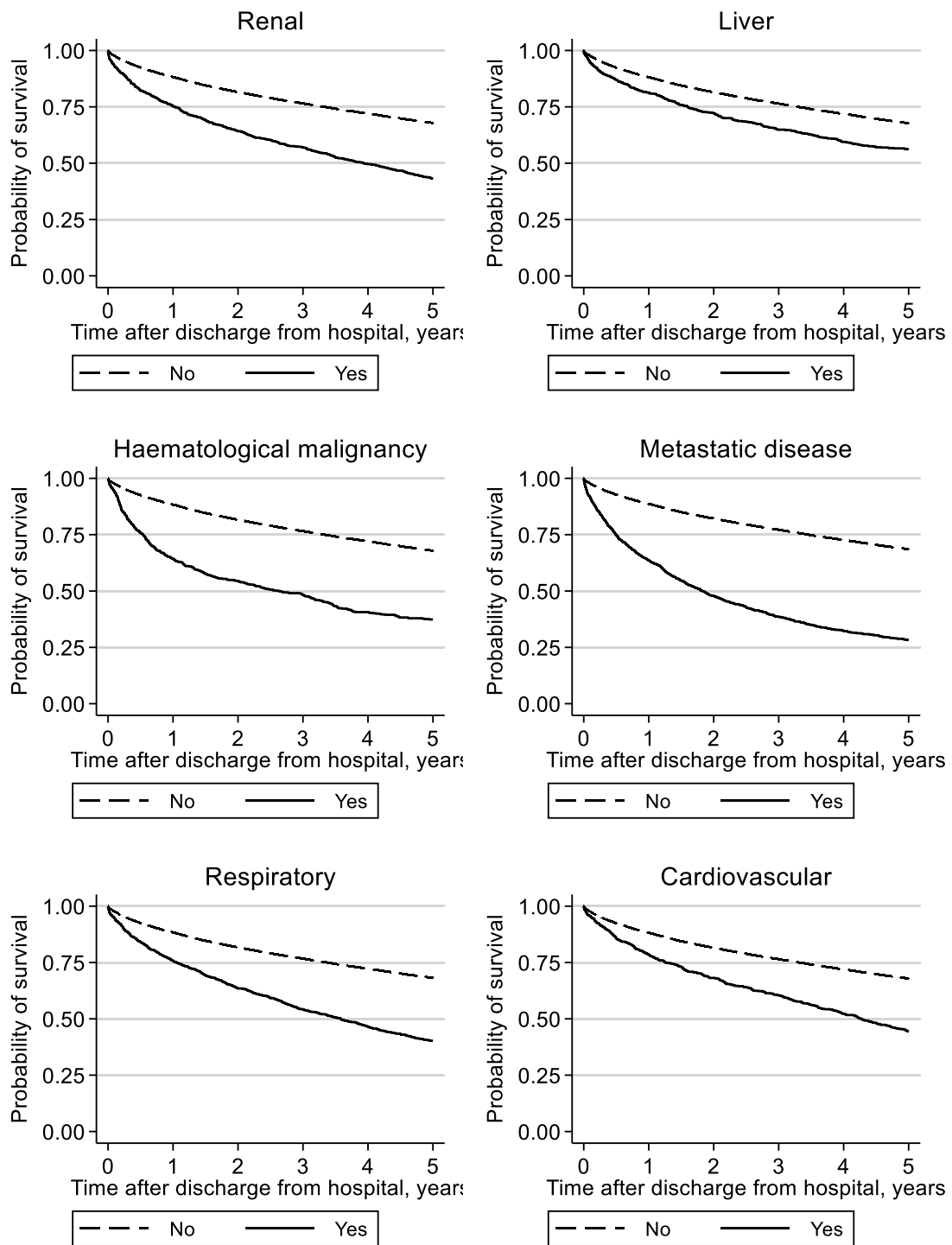


Figure S2 30-day SMR vs in-hospital SMR (Bland-Altman plot)

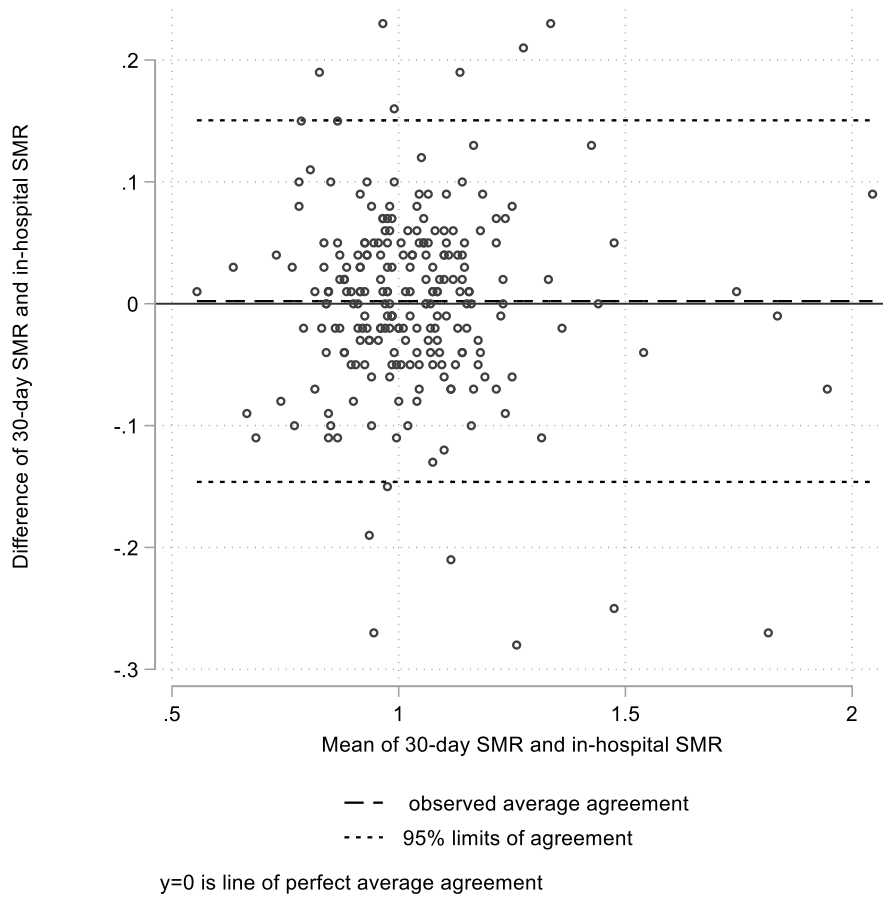


Figure S3 Calibration belt plot on the external sample for the risk models to predict acute hospital mortality and one-year mortality among patients admitted to cardiothoracic critical care units following cardiac surgery

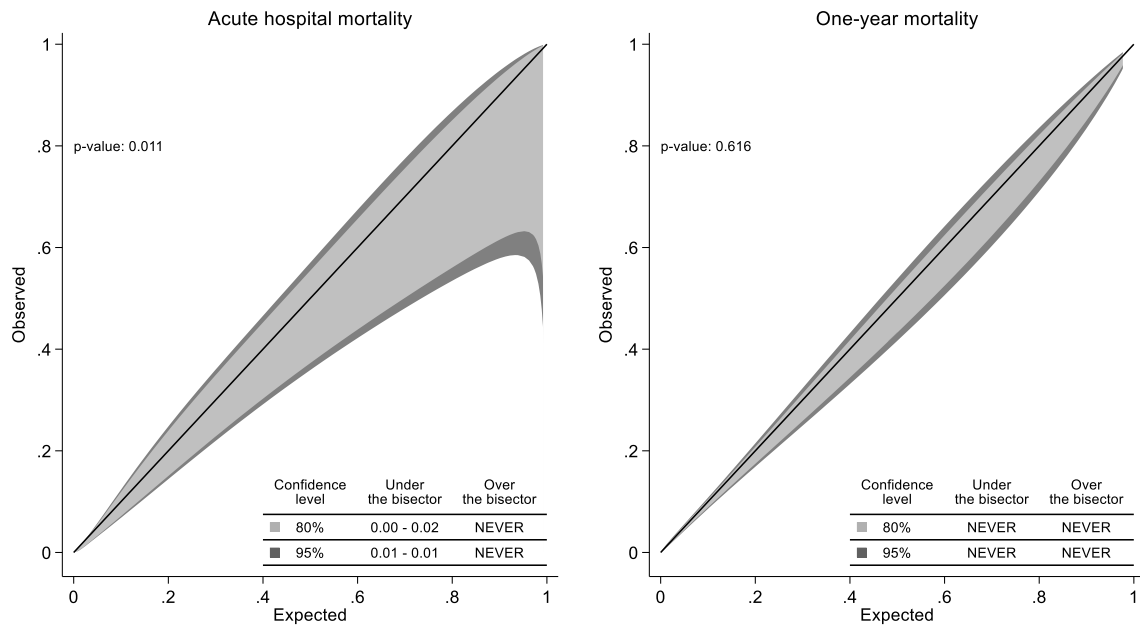


Figure S4 Calibration belt plot on the external sample for the risk models to predict acute hospital mortality and one-year mortality among in-hospital cardiac arrest patients.

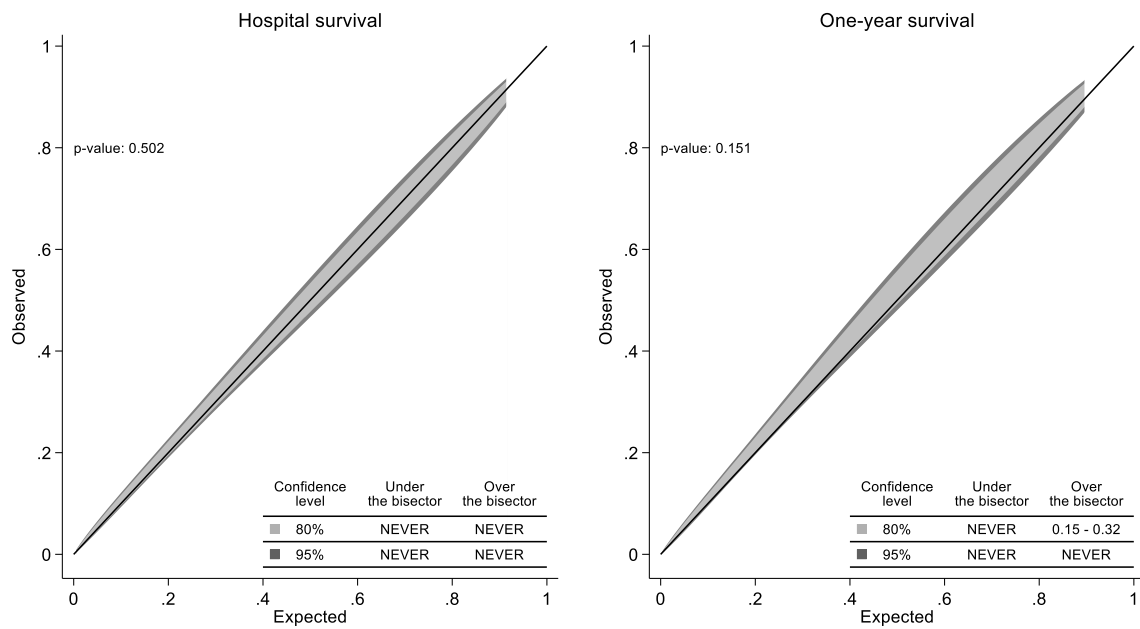


Figure S5 Total critical care length of stay splitting by survivors and non-survivors

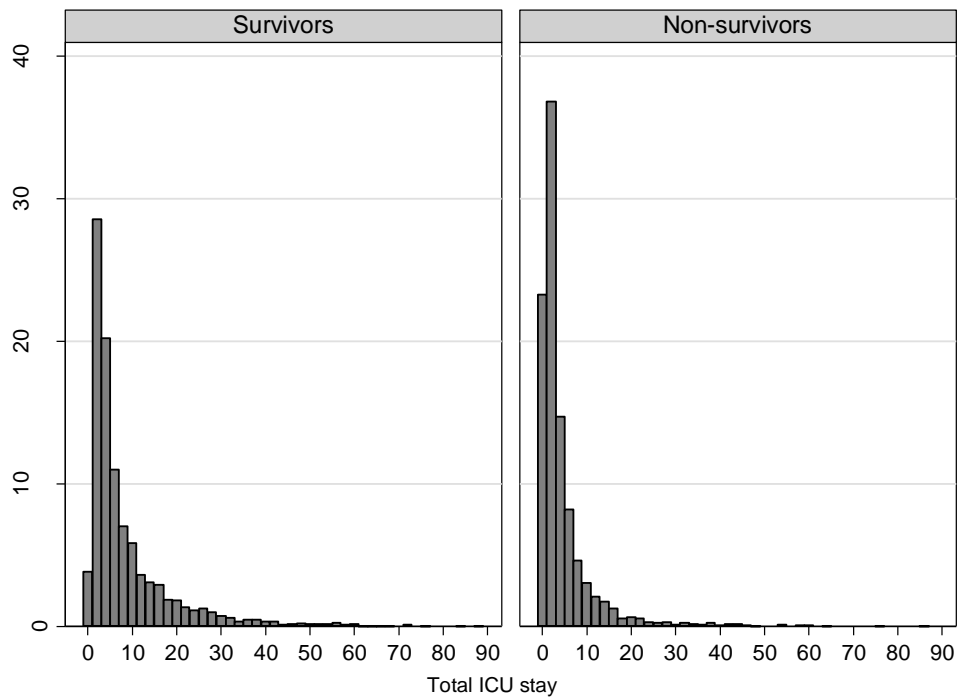


Figure S6 Relationship between ICNARC physiology score and total critical care length of stay split by survivors and non-survivors

