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Supplementary material

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Supplement to: Lau S, Shum HP, Chan CCY, et al. Prediction of hospital mortality among critically ill patients in a single centre in Asia: comparison of artificial neural networks and logistic regression–based model. Hong Kong Med J 2024;30:Epub 28 Mar 2024. https://doi.org/10.12809/hkmj2210235.

Supplementary Table 1. Covariates/factors used for creation of development set

	Normalised importance
Demographic parameters	
Age, y	52.8%
Sex	2.8%
Presence of significant cardiovascular disease (NYHA class IV)	4.7%
Presence of significant respiratory manifestations (chronic restriction or obstruction, or vascular disease resulting in severe exercise restriction)	5.0%
Presence of significant renal disease (receiving chronic dialysis)	8.7%
Presence of liver failure (prior episode of hepatic failure/encephalopathy/coma)	4.6%
Presence of liver cirrhosis	5.1%
Presence of immunocompromised status: AIDS	5.2%
Presence of immunocompromised status: lymphoma	9.7%
Presence of immunocompromised status: metastatic carcinoma	15.2%
Presence of immunocompromised status: leukaemia or multiple myeloma	6.0%
Use of high-dose steroids or other immunosuppressive agents	17.3%
Disease category	15.7%
Glasgow Coma Scale	32.7%
Operational parameters	
ICU admission source	12.6%
Parent specialty	19.1%
Emergency or elective admission	14.9%
Postoperative or non-operative case	4.4%
Mechanical ventilation used	6.9%
Physiological parameters	
Core temp (high), ℃	42.6%
Core temp (low), ℃	38.8%
Heart rate (high), beats/min	63.3%
Heart rate (low), beats/min	28.9%
Respiratory rate (high), breaths/min	41.7%
Respiratory rate (low), breaths/min	48.3%

Mean blood pressure (high), mm Hg	42.8%
Mean blood pressure (low), mm Hg	54.8%
Urine output in 24 hours, mL	58.8%
Urine collection duration, hr	32.0%
Laboratory parameters	
Sodium (high), mmol/L	100%
Sodium (low), mmol/L	49.3%
Potassium (high), mmol/L	26.8%
Potassium (low), mmol/L	55.5%
Urea (high), mmol/L	65.6%
Creatinine (high), μmol/L	65.4%
Creatinine (low), μmol/L	59.8%
Albumin (high), g/L	33.2%
Albumin (low), g/L	28.4%
Bilirubin (high), μmol/L	98.8%
White cell count (high), $\times 10^9$/L	42.7%
White cell count (low), $\times 10^9$/L	92.9%
Hemoglobulin (high), g/dL	40.8%
Hemoglobulin (low), g/dL	14.1%
Haematocrit (high)	26.6%
Haematocrit (low)	30.3%
Platelet (high), $\times 10^9$/L	25.0%
Platelet (low), $\times 10^9$/L	32.9%
Glucose (high), mmol/L	33.5%
Glucose (low), mmol/L	33.9%
1st pH	24.8%
1st $PaCO_2$, mm Hg	30.6%
1st PaO_2, mm Hg	20.2%
FiO_2 use during 1st blood gas test	17.8%

Abbreviations: AIDS = acquired immunodeficiency syndrome; FiO_2 = fraction of inspired oxygen; ICU = intensive care unit; NYHA = New York Heart Association; $PaCO_2$ = partial pressure of carbon dioxide; PaO_2 = partial pressure of oxygen

Supplementary Table 2. Covariates/factors used for creation of validation set*

	Normalised importance
Demographic parameters	
Age, y	43.1%
Sex	12.4%
Presence of significant cardiovascular disease (NYHA class IV)	No case
Presence of significant respiratory manifestations (chronic restriction or obstruction, or vascular disease resulting in severe exercise restriction)	14.0%
Presence of significant renal disease (receiving chronic dialysis)	7.8%
Presence of liver failure (prior episode of hepatic failure/encephalopathy/coma)	12.4%
Presence of liver cirrhosis	11.5%
Presence of immunocompromised status: AIDS	19.2%
Presence of immunocompromised status: lymphoma	6.7%
Presence of immunocompromised status: metastatic carcinoma	7.7%
Presence of immunocompromised status: leukaemia or multiple myeloma	9.7%
Use of high-dose steroids or other immunosuppressive agents	9.6%
Disease category	25.9%
Glasgow Coma Scale	34.4%
Operational parameters	
ICU admission source	19.8%
Parent specialty	23.8%
Emergency or elective admission	8.3%
Postoperative or non-operative case	15.3%
Mechanical ventilation used	12.0%
Physiological parameters	
Core temp (high), ℃	40.2%
Core temp (low), ℃	78.6%
Heart rate (high), beats/min	73.0%
Heart rate (low), beats/min	42.3%
Respiratory rate (high), breaths/min	56.0%
Respiratory rate (low), breaths/min	71.3%

Mean blood pressure (high), mm Hg	55.1%
Mean blood pressure (low), mm Hg	73.7%
Urine output in 24 hours, mL	68.2%
Urine collection duration, hr	55.8%
Laboratory parameters	
Sodium (high), mmol/L	54.7%
Sodium (low), mmol/L	71.4%
Potassium (high), mmol/L	40.7%
Potassium (low), mmol/L	32.1%
Urea (high), mmol/L	76.4%
Creatinine (high), μmol/L	43.1%
Creatinine (low), μmol/L	71.8%
Albumin (high), g/L	45.0%
Albumin (low), g/L	41.9%
Bilirubin (high), μmol/L	100%
White cell count (high), $\times 10^9$/L	56.0%
White cell count (low), $\times 10^9$/L	80.3%
Hemoglobulin (high), g/dL	30.9%
Hemoglobulin (low), g/dL	27.1%
Haematocrit (high)	47.2%
Haematocrit (low)	53.7%
Platelet (high), $\times 10^9$/L	65.0%
Platelet (low), $\times 10^9$/L	43.7%
Glucose (high), mmol/L	49.5%
Glucose (low), mmol/L	87.4%
1st pH	71.4%
1st $PaCO_2$, mm Hg	52.0%
1st PaO_2, mm Hg	28.0%
FiO_2 use during 1st blood gas test	54.6%

Abbreviations: AIDS = acquired immunodeficiency syndrome; FiO_2 = fraction of inspired oxygen; ICU = intensive care unit; NYHA = New York Heart Association; $PaCO_2$ = partial pressure of carbon dioxide; PaO_2 = partial pressure of oxygen

* Rescaling method for covariates: standardised

Supplementary Figure. Artificial neural network diagram