Table S1 Number of observations after each selection procedure

Step	Criteria	Number excluded	Number of remaining observations
1	ICU admissions in MIMIC-III database	–	58,976
2	Exclude patients with multiple admissions except for the first admission	17,508	41,468
3	Include patients on admission diagnosed with AMI (ICD-9 code between 410.00 and 410.92)	39,272	2,196
4	Include if patients aged ≥18 years	0	2,196
5	Exclude if length of ICU stay <24 hours	253	1,943
6	Exclude if patients at risk of oxygen-induced hypercapnia on admission (COPD, asthma, or pneumonia)	67	1,876
7	Exclude if patients with anemia, fluid and electrolyte disorder, and PVD on admission	12	1,864
8	Exclude if patients with cancer including hematologic malignancies	8	1,856
9	Exclude if patients with pregnancy, childbirth, or puerperium	0	1,856
10	Exclude if patients with missing SpO$_2$ data information	2	1,854
11	Exclude if patients with missing oxygen therapy information	8	1,846

ICU, intensive care unit; MIMIC, Medical Information Mart for Intensive Care ; AMI, acute myocardial infarction; ICD-9, International Classification of Diseases, Ninth Revision; COPD, chronic obstructive pulmonary disease; PVD, peripheral vascular disease.

Table S2 Missing number (%) for characteristics

Characteristics	Missing number (%)
Demographics	
Age	0 (0)
Gender	0 (0)
Ethnicity	0 (0)
Marital status	0 (0)
BMI	274 (14.8)
Admission type	0 (0)
Vital signs	
HR	0 (0)
SBP	0 (0)
DBP	0 (0)
MBP	0 (0)
RR	0 (0)
T	31 (1.7)
SpO$_2$	0 (0)
Comorbidities	
Cardiogenic shock	0 (0)
Cardiac arrest	0 (0)
Congestive heart failure	0 (0)
Hypertension	0 (0)
Cardiac arrhythmias	0 (0)
Pulmonary circulation disorder	0 (0)
Diabetes	0 (0)
Stroke	0 (0)
Renal failure	0 (0)
Liver disease	0 (0)
Coagulopathy	0 (0)
Obesity	0 (0)
Weight loss	0 (0)
Elixhauser comorbidity index	0 (0)

Table S2 (*continued*)

Table S2 (*continued*)

Characteristics	Missing number (%)
Laboratory parameters	
WBC	423 (22.9)
Hb	423 (22.9)
HCT	363 (19.7)
PLT	341 (18.5)
Troponin t	514 (27.8)
BUN	400 (21.7)
Glucose	490 (26.5)
Creatinine	401 (21.7)
PH	321 (17.4)
Lactate	399 (21.6)
Scoring system	
SOFA	0 (0)
SAPS II	0 (0)
SIRS	0 (0)
GCS	6 (0.3)
Treatment information	
PCI	56 (3.0)
CABG	6 (0.3)
Oxygen therapy	0 (0)
Renal replacement treatment	0 (0)
ICU LOS	0 (0)
In-hospital LOS	0 (0)
Outcome variable	
In-hospital mortality	0 (0)

BMI, body mass index; HR, heart rate; SBP, systolic blood pressure; MBP, mean blood pressure; DBP, diastolic blood pressure; RR, respiratory rate; T, temperature; WBC, white blood cell; Hb, hemoglobin; HCT, hematocrit; PLT, platelet; BUN, blood urea nitrogen; SOFA, Sequential Organ Failure Assessment; SAPS, Systemic Inflammatory Response Syndrome; SIRS, Systemic Inflammatory Response Syndrome; GCS, Glasgow Coma Scale; PCI: percutaneous coronary intervention; CABG: coronary artery bypass grafting; LOS, length of stay.

Table S3 Univariable and multivariable Cox regression analysis of prognostic predictors for all-cause in-hospital mortality in patients with AMI

Characteristics	Univariable analysis		Multivariable analysis	
	HR (95% CI)	P value	HR (95% CI)	P value
Demographics				
Age, years	1.023 (1.016, 1.030)	<0.001	1.012 (1.002,1.018)	0.001
Gender, male	1.448 (1.230, 1.705)	<0.001	1.100 (0.892, 1.310)	0.499
Ethnicity, white	0.985 (0.831, 1.166)	0.857		
Marital status				
Married	Ref		Ref	
Single	1.226 (0.976, 1.540)	0.080	1.240 (0.910, 1.586)	0.078
Others	1.103 (0.920, 1.323)	0.288	1.019 (0.781, 1.189)	0.791
BMI, kg/m^2	0.989 (0.977, 1.002)	0.107		
Admission type				
Emergency	Ref		Ref	
Elective	0.517 (0.327, 0.818)	0.005	0.511 (0.288, 0.889)	0.041
Urgent	0.746 (0.503, 1.106)	0.145	0.581 (0.372, 0.902)	0.017
Vital signs				
HR, beats/min	0.998 (0.993, 1.004)	0.505		
SBP, mmHg	0.998 (0.992, 1.003)	0.390		
DBP, mmHg	0.987 (0.979, 0.995)	0.002	0.954 (0.933, 0.981)	0.003
MBP, mmHg	0.986 (0.978, 0.995)	0.002	1.005 (0.992, 1.025)	0.064
RR, beats/min	1.020 (1.001, 1.040)	0.037	1.052 (1.030, 1.082)	<0.001
T, ℃	0.903 (0.803, 1.014)	0.085	0.882 (0.732, 1.100)	0.688
SpO$_2$ level				
Group 1 (96%≤ SpO$_2$ ≤98%)	Ref		Ref	
Group 2 (SpO$_2$ <96%)	1.783 (1.433, 2.217)	<0.001	1.352 (1.048, 1.715)	0.028
Group 3 (98%< SpO$_2$ ≤100%)	1.495 (1.245, 1.796)	<0.001	1.315 (1.018, 1.658)	0.030
Comorbidities				
Congestive heart failure	1.037 (0.879, 1.223)	0.664		
Hypertension	1.005 (0.854, 1.183)	0.949		
Cardiac arrhythmias	0.966 (0.819, 1.139)	0.681		
Cardiogenic shock	1.923 (1.682, 2.295)	<0.001	1.711 (1.425, 2.117)	<0.001
Cardiac arrest	2.154 (1.712, 2.679)	<0.001	2.048 (1.674, 2.432)	<0.001
Pulmonary circulation disorder	0.799 (0.583, 1.095)	0.163		
Diabetes	0.988 (0.812, 1.203)	0.907		
Stroke	1.069 (0.842, 1.356)	0.585		
Renal failure	1.282 (1.048, 1.568)	0.016	1.342(0.891, 1.504)	0.058
Liver disease	1.050 (0.769, 1.435)	0.758		
Coagulopathy	0.728 (0.561, 0.945)	0.017	1.255 (0.937, 1.791)	0.148
Obesity	0.630 (0.355, 1.116)	0.113		
Weight loss	0.573 (0.342, 0.960)	0.034	1.123 (0.579, 2.170)	0.688
Elixhauser comorbidity index	1.000 (0.993, 1.008)	0.894		
Laboratory parameters				
WBC, 10^9/L	1.002 (0.987, 1.018)	0.758		
Hb, g/dL	0.998 (0.964, 1.034)	0.927		
HCT, %	1.000 (0.988, 1.013)	0.951		
PLT, 10^9 /L	1.000 (0.999, 1.000)	0.414		
Troponin t, ng/mL	0.995 (0.978, 1.012)	0.562		
BUN, mg/dL	1.002 (0.998, 1.007)	0.264		
Glucose, mg/dL	1.000 (0.999, 1.001)	0.789		
Creatinine, mEq/L	1.012 (0.954, 1.074)	0.689		
PH	0.982 (0.947, 1.056)	0.576		
Scoring system				
SOFA	1.033 (1.009, 1.057)	0.007	1.044 (1.001, 1.087)	0.040
SAPS II	1.015 (1.010, 1.021)	<0.001	1.011 (1.000, 1.021)	0.018
SIRS	0.969 (0.888, 1.058)	0.482		
GCS	0.986 (0.958, 1.014)	0.321		
Treatment information				
PCI	0.743 (0.532, 0.810)	<0.001	0.722 (0.502, 0.789)	<0.001
CABG	0.912 (0.872, 1.112)	0.532		
Oxygen therapy	1.071 (0.910, 1.260)	0.410		
Renal replacement treatment	0.968 (0.759, 1.234)	0.793		
ICU LOS, days	0.943 (0.931, 0.956)	<0.001	1.021 (0.998, 1.038)	0.052

BMI, body mass index; HR, heart rate; SBP, systolic blood pressure; MBP, mean blood pressure; DBP, diastolic blood pressure; RR, respiratory rate; T, temperature; WBC, white blood cell; Hb, hemoglobin; HCT, hematocrit; PLT, platelet; BUN, blood urea nitrogen; SOFA, Sequential Organ Failure Assessment; SAPS, Systemic Inflammatory Response Syndrome; SIRS, Systemic Inflammatory Response Syndrome; GCS, Glasgow Coma Scale; PCI: percutaneous coronary intervention; CABG: coronary artery bypass grafting; LOS, length of stay. HR, hazard ratio; CI, confidence interval; ref, reference.

Table S4 Relationship between SpO_2 levels and all-cause in-hospital mortality in different models among patients without hypoxemia

Variables	Model I		Model II		Model III	
	HR (95% CI)	P value	HR (95% CI)	P value	HR (95% CI)	P value
SpO_2 groups						
Group 1 (94%≤ SpO_2 ≤96%)	Ref		Ref		Ref	
Group 2 (SpO_2 <94%)	1.660 (1.326, 2.078)	<0.001	1.731 (1.382, 2.169)	<0.001	1.879 (1.456, 2.278)	<0.001
Group 3 (96%< SpO_2 ≤100%)	1.496 (1.246, 1.797)	<0.001	1.487 (1.238, 1.785)	<0.001	1.408 (1.255, 1.788)	<0.001

HR, hazard ratio; CI, confidence interval; ref, reference.

Table S5 Relationship between SpO_2 levels and all-cause in-hospital mortality in different models using the original data

Variables	Model I		Model II		Model III	
	HR (95% CI)	P value	HR (95% CI)	P value	HR (95% CI)	P value
SpO_2 groups						
Group 1 (94%≤ SpO_2 ≤96%)	Ref		Ref		Ref	
Group 2 (SpO_2 <94%)	1.701 (1.255, 2.307)	<0.001	1.718 (1.267, 2.331)	<0.001	1.688 (1.176, 2.274)	<0.001
Group 3 (96%< SpO_2 ≤100%)	1.375 (1.081, 1.747)	0.009	1.386 (1.090, 1.762)	0.008	1.202 (0.921, 1.554)	0.145

HR, hazard ratio; CI, confidence interval; ref, reference.