**Table S1** Variables required for each scores in this study

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **SSS** | **APACHE II** | **APACHE III** | **APACHE IV** | **SAPS II** | **SAPS 3** |
| Age |  | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |
| Sex |  |  |  | 🗸 |  |  |
| Co-morbidities (n) |  | 🗸 (5) | 🗸 (7) | 🗸 (8) | 🗸 (3) | 🗸 (6) |
| Type of ICU admission |  | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |
| ICU admission source | 🗸 |  | 🗸 | 🗸 |  | 🗸 |
| LOS before ICU admission |  |  | 🗸 | 🗸 |  | 🗸 |
| Geographic region | 🗸 |  |  |  |  | 🗸 |
| Reasons for ICU admission (n) |  | 🗸 (50) | 🗸 (78) | 🗸 (116) |  | 🗸 (11) |
| Sites of infection | 🗸 |  |  | 🗸 |  | 🗸 |
| Vasopressor therapy | 🗸 |  |  |  |  | 🗸 |
| Mechanical ventilation | 🗸 |  | 🗸 | 🗸 | 🗸 |  |
| **Physiological variables** |  |  |  |  |  |  |
| Temperature | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |
| Heart rate |  | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |
| Respiratory rate | 🗸 | 🗸 | 🗸 | 🗸 |  |  |
| Blood pressure | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |
| Hematocrit |  | 🗸 | 🗸 | 🗸 |  |  |
| White blood cells | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |
| Platelets | 🗸 |  |  |  |  | 🗸 |
| Albumin |  |  | 🗸 | 🗸 |  |  |
| Bilirubin | 🗸 |  | 🗸 | 🗸 | 🗸 | 🗸 |
| Glucose | 🗸 |  | 🗸 | 🗸 |  |  |
| Serum Na |  | 🗸 | 🗸 | 🗸 | 🗸 |  |
| Serum K |  | 🗸 |  | 🗸 | 🗸 |  |
| Serum HCO3 |  | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |
| BUN |  |  | 🗸 | 🗸 | 🗸 |  |
| Creatinine | 🗸 | 🗸 | 🗸 | 🗸 |  | 🗸 |
| Urine output | 🗸 |  | 🗸 | 🗸 | 🗸 |  |
| ABG  | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |
| Lactate | 🗸 |  |  |  |  |  |
| Glasgow Coma Score | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 | 🗸 |

ABG: arterial blood gas; APACHE: Acute Physiology and Chronic Health Evaluation; BUN: blood urea nitrogen; ICU: intensive care unit; LOS: length of stay; SAPS: Simplified Acute Physiology Score; SSS: Sepsis Severity Score

**Table S2** Sepsis Severity Score components

|  |  |  |
| --- | --- | --- |
| **Variables** | **Coefficient** | **Point values** |
| Sepsis origin |  |  |
|  - Emergency department (referent) | 0.000 | 0 |
|  - Ward | 0.422 | 10 |
|  - ICU | 0.457 | 11 |
| Geographic region |  |  |
|  - North America (referent) | 0.000 | 0 |
|  - Europe | 0.263 | 9 |
|  - South America | 0.826 | 14 |
| Cardiovascular failure | 0.224 | 8 |
| Lactate > 4 mmol/L | 1.249 | 18 |
| Cardiovascular failure with lactate > 4 mmol/L  | -0.594 | 0 |
| No hypotension (referent) | 0.000 | 0 |
| Unresponsive hypotension | 0.385 | 10 |
| Responsive hypotension | 0.271 | 9 |
| Received ≥ 20 mL/kg of crystalloid or equivalent | -0.493 | 1 |
| Received vasopressors | 0.340 | 9 |
| Site of infections |  |  |
|  **-** Pneumonia | 0.340 | 9 |
|  - Urinary tract  | -0.121 | 5 |
|  - Abdominal  | 0.178 | 8 |
|  - Meningitis | -0.428 | 2 |
|  - Catheter | 0.275 | 9 |
|  - Device | 0.387 | 10 |
|  - Other infection | 0.236 | 8 |
| Renal failure | 0.256 | 9 |
| Hepatic failure | 0.156 | 8 |
| Hematologic failure | 0.385 | 10 |
| No MV and no respiratory failure (referent) | 0.000 | 0 |
| No MV and respiratory failure | 0.198 | 8 |
| MV with plateau pressure < 30 cmH2O and no respiratory failure | 0.817 | 14 |
| MV with plateau pressure < 30 cmH2O and respiratory failure | 0.771 | 14 |
| MV with plateau pressure ≥ 30 cmH2O independent of respiratory failure | 1.099 | 17 |
| Hyperthermia (>38.3°C) | -0.375 | 2 |
| Hypothermia (<36°C) | 0.322 | 9 |
| Chill with rigor | -0.399 | 2 |
| Tachypnea (>20 beats/min) | 0.120 | 7 |
| Leukopenia (Wbc <4,000/uL) | 0.254 | 9 |
| Hyperglycemia (plasma glucose > 120 mg/dL) | -0.188 | 4 |
| Acutely alter mental status | 0.164 | 8 |
| Constant | -2.416 |  |

MV: mechanical ventilation; Unresponsive hypotension: mean arterial pressure (MAP)< 65 mmHg despite 20 cc/kg fluid challenge; Responsive hypotension: MAP ≥ 65 mmHg after 20 cc/kg fluid challenge; Wbc: white blood cells

SSS Logit = -2.8334 + (SSS×0.0366)

SSS probability hospital mortality = elogit/(1+elogit)

**Table S3** Comparison of the area under a receiver operating characteristic curve for Sepsis Severity Score and other severity scores according to subgroups of sepsis patients

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Subgroup of sepsis | SSS | APACHE II | APACHE III | APACHE IV | SAPS II | SAPS 3 |
| Sepsis (exclude septic shock) (Sepsis-3) (n=437) | 0.864 (0.821-0.907) | 0.872 (0.832-0.912)P=0.72 | 0.884 (0.843-0.924)P=0.35 | 0.909 (0.873-0.944)P=0.02 | 0.861 (0.819-0.903)P=0.87 | 0.855 (0.808-0.901)P=0.64 |
| Septic shock (Sepsis-3) (n=476)  | 0.864 (0.839-0.897) | 0.917(0.892-0.942)P=0.006 | 0.940 (0.921-0.959)P<0.0001 | 0.959 (0.943-0.974)P<0.0001 | 0.921 (0.897-0.944)P=0.002 | 0.917 (0.892-0.941)P=0.002 |
| Severe sepsis (Sepsis-2) (n=111) | 0.604(0.402-.0806) | 0.752(0.598-0.906)P=0.07 | 0.796(0.570-0.968)P=0.02 | 0.800(0.640-0.960)P=0.007 | 0.797(0.651-0.943)P=0.01 | 0.716(0.519-0.913)P=0.08 |
| Septic shock (Sepsis-2) (n=802) | 0.890(0.868-0.912) | 0.919(0.90-0.938)P=0.02 | 0.929(0.912-0.947)P=0.001 | 0.949(0.934-0.964)P<0.0001 | 0.908(0.888-0.928)P=0.15 | 0.907(0.885-0.928)P=0.16 |
| Community-acquiredinfection (n=641) | 0.882(0.854-0.911) | 0.915 (0.891-0.939)P=0.02 | 0.920 (0.896-0.945)P=0.005 | 0.939(0.919-0.96)P<0.0001 | 0.912 (0.887-0.936)P=0.03 | 0.902(0.874-0.929)P=0.13 |
| Nosocomial-acquiredinfection (n=272) | 0.860(0.813-0.907) | 0.896(0.857-0.935)P=0.17 | 0.935 (0.907-0.962)P=0.003 | 0.942(0.916-0.969)P=0.0006 | 0.904(0.87-0.938)P=0.07 | 0.900(0.864-0.936)P=0.10 |
| Admitted from ED(n=434) | 0.895(0.863-0.927) | 0.928 (0.903-0.953)P=0.04 | 0.936 (0.91-0.961)P=0.006 | 0.950(0.928-0.971)P=0.0002 | 0.923 (0.895-0.95)P=0.06 | 0.908 (0.874-0.942)P=0.39 |
| Admitted from wards(n=400) | 0.886 (0.854-0.918) | 0.910(0.882-0.937)P=0.15 | 0.929 (0.904-0.953)P=0.008 | 0.944(0.922-0.966)P=0.0001 | 0.907 (0.879-0.935)P=0.21 | 0.909(0.881-0.937)P=0.17 |
| Respiratory tract infection (n=448) | 0.882 (0.852-0.913) | 0.919 (0.894-0.944)P=0.03 | 0.936 (0.914-0.958)P=0.0007 | 0.956(0.938-0.973)P<0.0001 | 0.902 (0.874-0.93)P=0.2 | 0.904 (0.875-0.933)P=0.19 |
| Age<=60 yrs(n=435) | 0.878 (0.845-0.912) | 0.932 (0.908-0.956)P=0.001 | 0.942(0.919-0.965)P=0.001 | 0.950(0.929-0.971)P<0.0001 | 0.921(0.896-0.947)P=0.009 | 0.918(0.89-0.947)P=0.009 |
| Age>60 yrs(n=478) | 0.903 (0.877-0.93) | 0.903 (0.876-0.930)P=0.98 | 0.919 (0.894-0.943)P=0.3 | 0.946(0.926-0.966)P=0.001 | 0.909(0.882-0.936)P=0.7 | 0.902 (0.873-0.93)P=0.9 |
| Exclude patients were transferred from other hospitals (n=834) | 0.898 (0.877-0.919) | 0.913 (0.894-0.932)P=0.09 | 0.931 (0.913-0.948)P=0.002 | 0.949 (0.934-0.964)P<0.0001 | 0.915 (0.896-0.935)P=0.12 | 0.913 (0.892-0.933)P=0.17 |

P-value compare with the Sepsis Severity Score (SSS)

APACHE: Acute Physiology and Chronic Health Evaluation; ED: Emergency Department; SAPS: Simplified Acute Physiology Score; SSS: Sepsis Severity Score

**Table S**4 The overall performance of the prognostic scores for various subgroups analysis of sepsis patients

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | SSS  | APACHE II | APACHE III | APACHE IV | SAPS II | SAPS 3 |
| Sepsis (exclude septic shock) (Sepsis-3) (n=437) | 0.130 | 0.125 | 0.111 | 0.097 | 0.130 | 0.148 |
| Septic shock (Sepsis-3) (n=476) | 0.171 | 0.124 | 0.119 | 0.095 | 0.118 | 0.133 |
| Severe sepsis (Sepsis-2) (n=111) | 0.090 | 0.114 | 0.090 | 0.080 | 0.089 | 0.118 |
| Septic shock (Sepsis-2) (n=802) | 0.158 | 0.126 | 0.124 | 0.098 | 0.128 | 0.143 |
| Commnity-acquired infection (n=641) | 0.139 | 0.122 | 0.109 | 0.094 | 0.125 | 0.145 |
| Nosocomial-acquired infection (n=272) | 0.176 | 0.13 | 0.146 | 0.100 | 0.119 | 0.129 |
| Admitted from ED (n=434) | 0.137 | 0.119 | 0.104 | 0.088 | 0.118 | 0.139 |
| Admitted from wards(n=400) | 0.162 | 0.129 | 0.138 | 0.102 | 0.124 | 0.133 |
| Respiratory tract infection (n=448) | 0.161 | 0.125 | 0.160 | 0.097 | 0.129 | 0.142 |
| Age<=60 (n=435) | 0.153 | 0.114 | 0.110 | 0.090 | 0.110 | 0.120 |
| Age>60 (n=478) | 0.150 | 0.134 | 0.150 | 0.100 | 0.136 | 0.158 |
| Exclude patients were transferred from other hospital (n=834) | 0.149 | 0.124 | 0.120 | 0.095 | 0.121 | 0.137 |

APACHE: Acute Physiology and Chronic Health Evaluation; ED: Emergency Department; SAPS: Simplified Acute Physiology Score; SSS: Sepsis Severity Score

**Figure S1** Calibration curves for Sepsis Severity Score and Simplified Acute Physiology Score II and 3

