1   **Effectiveness of a sepsis programme in a resource-limited setting: a retrospective analysis of**

2   **data of a prospective observational study (Ubon-sepsis)**

3

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10   Short Title: Sepsis Fast Track Thailand

11

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25 **Supplementary Table 1 | Criteria used to systematically enroll patents into Sepsis Fast Track**

26 **(SFT) upon admission**

27 1. **Present with 2 or more of below Signs of systemic inflammatory response syndrome**
28 **(SIRS)**
29 - Body temperature > 38.3 °C or < 36.0 °C
30 - Heart rate > 90 bpm
31 - Respiratory rate > 20 pm or $PaCO_2$ < 32 mmHg
32 - WBC > 12,000 /µL or < 4,000 /µL or Band forms > 10%
33 2. **Suspected sources of infection**
34 - Pneumonia
35 - Urinary track infection
36 - Intra-abdominal infection
37 - Skin and soft tissue infection
38 - CNS infection
39 - Others infections or unspecified source of infection
40 3. **Diagnostic criteria for severe sepsis:** patient met criteria in no 1 and 2 and has at least
41 one of the following criteria
42 - Mottled skin
43 - Capillary refilling time ≥ 3 seconds
44 - Urine output < 0.5 ml/kg/hour
45 - Abrupt change in mental status
46 - Acute respiratory failure
47 - Platelet count < 100,000 /µL
48 - Disseminated intravascular coagulation
49 - Lactate > 2 mmol/L
50 - SBP < 90 mmHg or MAP < 65 mmHg
51 4. **Diagnostic criteria for septic shock:** patient who are severe sepsis and has at least 1 of
52 the following criteria
53 - SBP < 90 mmHg or MAP < 65 mmHg after crystalliod administration ≥ 40-60
54 ml/kg of body weight OR after colloid administration ≥ 20-30 ml/kg of body weight
55 - Require administration of dopamine > 5µg/kg of BW/min or norepinephrine/
56 epinephrine > 0.02 µg/kg of BW/min to maintain MAP to be > 65 mmHg
57

58 **Supplementary Table 2 | Systemic manifestation of infection criteria used for enrollment in**

59 **Ubon-Sepsis Cohort**

60 **General parameters**
61   1. Fever or hypothermia (Core body temperature defined as > 38.3 °C or < 36.0 °C)
62   2. Tachycardia (heart rate > 90 beats per minute)
63   3. Tachypnea (respiratory rate > 20 per minute)
64   4. Altered mental status with Glasgow Coma Score (GCS) < 15 or <10 if intubated
65   5. Hyperglycemia (plasma glucose > 140 mg/dL) in the absence of diabetes
66 **Inflammatory parameters**
67   6. Leukocytosis (white blood cell count > 12,000/µL), leukopenia (white blood cell count <
68   4000/µL) or immature forms > 10%
69   7. Plasma C-reactive protein > 2 SD above the normal value
70   8. Plasma procalcitonin > 2 SD above the normal value
71 **Hemodynamic parameters**
72   9. Arterial hypotension (systolic blood pressure (SBP) < 90 mmHg, mean arterial pressure
73   (MAP) < 70 mmHg, or SBP decrease > 40 mmHg)
74 **Organ dysfunction parameters**
75   10. Low oxygen saturation determined by pulse oximetry (SpO2 < 95%) determined by pulse
76   oximetry
77   11. Arterial hypoxemia (PaO2 / FIO2 < 300)
78   12. Acute oliguria (urine output < 0.5 mL/kg/hr or 45 mmol/L for 2 hours)
79   13. Creatinine increase > 0.5 mg/dL
80   14. Coagulation abnormalities (international normalised ratio >1·5 or activated partial
81   thromboplastin time >60 seconds)
82   15. Thrombocytopenia (Platelet count < 100,000 cells/µL)
83   16. Ileus (absent bowel sounds)
84   17. Hyperbilirubinaemia (plasma total bilirubin > 4 mg/dL)
85 **Tissue perfusion parameters**
86   18. Hyperlactatemia (> 1 mmol/L)
87   19. Decreased capillary refill or mottling
88   20. Significant edema or positive fluid balance
89

90   **Supplementary Table 3 | Factors associated with 28-day mortality using multivariable Cox**

91   **proportional hazards model**

Variables	Died (n=779)	Survived (n=3027)	Adjusted hazard ratio (95%CI)	P value
SFT group[1]	205 (26%)	698 (23%)	0.72 (0.58-0.88)	0.001
Male gender	445 (57%)	698 (23%)	0.87 (0.75-1.01)	0.06
Age group (years) (n [%])				
• 18-40	59 (8%)	688 (23%)	1	<0.001
• >40-60	222 (29%)	930 (31%)	1.72 (1.28-2.30)	
• >60-70	159 (20%)	568 (19%)	2.10 (1.54-2.86)	
• >70	339 (44%)	841 (28%)	3.41 (2.57-4.53)	
Transferred from other hospital	715 (92%)	2595 (86%)	1.14 (0.88-1.49)	0.33
Modified SOFA score (median, IQR)	6 (4-9)	4 (3-6)	1.23 (1.21-1.26)	<0.001
Comorbidities				
• Diabetes mellitus	205 (26%)	602 (20%)	1.06 (0.90-1.26)	0.47
• Chronic kidney disease	141 (18%)	379 (13%)	1.22 (1.01-1.48)	0.04
• Liver disease	39 (5%)	85 (3%)	1.27 (0.91-1.76)	0.16
• Malignancy	24 (3%)	36 (1%)	2.64 (1.75-3.99)	<0.001
Blood culture positive for pathogenic organisms	190 (24%)	332 (11%)	1.83 (1.55-2.17)	<0.001
Year				
• 2013	165 (21%)	637 (21%)	1	0.30
• 2014	183 (23%)	651 (22%)	1.03 (0.83-1.27)	
• 2015	207 (27%)	808 (27%)	1.05 (0.84-1.31)	
• 2016[2]	224 (29%)	931 (31%)	0.88 (0.70-1.11)	
Direct admission to the ICU	128 (16%)	170 (6%)	1.68 (1.36-2.06)	<0.001

92   [1] Enrolled in the Sepsis Fast Track (SFT) programme

93   [2] Included 28 patients in 2017

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95 **Supplementary Table 4 | Factors associated with 28-day mortality using multivariable Cox**

96 **proportional hazards model without a variable of the direct admission to the ICU**

Variables	Died (n=779)	Survived (n=3027)	Adjusted hazard ratio (95%CI)	P value
SFT group[1]	205 (26%)	698 (23%)	0.77 (0.63-0.94)	0.01
Male gender	445 (57%)	698 (23%)	0.86 (0.74-1.00)	0.05
Age group (years) (n [%])				
• 18-40	59 (8%)	688 (23%)	1	<0.001
• >40-60	222 (29%)	930 (31%)	1.69 (1.26-2.26)	
• >60-70	159 (20%)	568 (19%)	2.07 (1.52-2.81)	
• >70	339 (44%)	841 (28%)	3.32 (2.50-4.41)	
Transferred from other hospital	715 (92%)	2595 (86%)	1.16 (0.89-1.52)	0.26
Modified SOFA score (median, IQR)	6 (4-9)	4 (3-6)	1.25 (1.22-1.27)	<0.001
Comorbidities				
• Diabetes mellitus	205 (26%)	602 (20%)	1.08 (0.91-1.27)	0.39
• Chronic kidney disease	141 (18%)	379 (13%)	1.20 (0.99-1.45)	0.07
• Liver disease	39 (5%)	85 (3%)	1.24 (0.89-1.72)	0.20
• Malignancy	24 (3%)	36 (1%)	2.52 (1.67-3.81)	<0.001
Blood culture positive for pathogenic organisms	190 (24%)	332 (11%)	1.83 (1.54-2.16)	<0.001
Year				
• 2013	165 (21%)	637 (21%)	1	0.34
• 2014	183 (23%)	651 (22%)	0.98 (0.79-1.21)	
• 2015	207 (27%)	808 (27%)	1.01 (0.81-1.26)	
• 2016[2]	224 (29%)	931 (31%)	0.85 (0.68-1.07)	

97 [1] Enrolled in the Sepsis Fast Track (SFT) programme

98 [2] Included 28 patients in 2017

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99   **Supplementary Table 5 | Factors associated with 28-day mortality using logistic**

100   **multivariable model**

Variables	Died (n=779)	Survived (n=3027)	Adjusted odds ratio (95%CI)	P value
SFT group[1]	205 (26%)	698 (23%)	0.61 (0.48-0.79)	<0.001
Male gender	445 (57%)	698 (23%)	0.88 (0.73-1.06)	0.18
Age group (years) (n [%])				
• 18-40	59 (8%)	688 (23%)	1	<0.001
• >40-60	222 (29%)	930 (31%)	1.91 (1.36-2.66)	
• >60-70	159 (20%)	568 (19%)	2.54 (1.78-3.63)	
• >70	339 (44%)	841 (28%)	4.76 (3.43-6.59)	
Transferred from other hospital	715 (92%)	2595 (86%)	1.21 (0.89-1.65)	0.23
Modified SOFA score (median, IQR)	6 (4-9)	4 (3-6)	1.30 (1.26-1.34)	<0.001
Comorbidities				
• Diabetes mellitus	205 (26%)	602 (20%)	1.12 (0.91-1.39)	0.29
• Chronic kidney disease	141 (18%)	379 (13%)	1.20 (0.94-1.53)	0.13
• Liver disease	39 (5%)	85 (3%)	1.34 (0.85-2.10)	0.21
• Malignancy	24 (3%)	36 (1%)	3.65 (2.05-6.51)	<0.001
Blood culture positive for pathogenic organisms	190 (24%)	332 (11%)	2.08 (1.66-2.61)	<0.001
Year				
• 2013	165 (21%)	637 (21%)	1	0.64
• 2014	183 (23%)	651 (22%)	1.05 (0.80-1.37)	
• 2015	207 (27%)	808 (27%)	1.05 (0.80-1.38)	
• 2016[2]	224 (29%)	931 (31%)	0.91 (0.69-1.21)	
Admitted directly to an ICU upon admission	128 (16%)	170 (6%)	1.95 (1.45-2.62)	<0.001

101   [1] Enrolled in the Sepsis Fast Track (SFT) programme

102   [2] Included 28 patients in 2017

103

104 **Supplementary Table 6 | Factors associated with 28-day mortality using logistic**

105 **multivariable model without a variable of the direct admission to the ICU**

Variables	Died (n=779)	Survived (n=3027)	Adjusted odds ratio (95%CI)	P value
SFT group[1]	205 (26%)	698 (23%)	0.67 (0.53-0.86)	0.002
Male gender	445 (57%)	698 (23%)	0.87 (0.73-1.05)	0.14
Age group (years) (n [%])				
• 18-40	59 (8%)	688 (23%)	1	<0.001
• >40-60	222 (29%)	930 (31%)	1.85 (1.33-2.58)	
• >60-70	159 (20%)	568 (19%)	2.44 (1.71-3.46)	
• >70	339 (44%)	841 (28%)	4.55 (3.29-6.28)	
Transferred from other hospital	715 (92%)	2595 (86%)	1.23 (0.90-1.68)	0.19
Modified SOFA score (median, IQR)	6 (4-9)	4 (3-6)	1.32 (1.28-1.36)	<0.001
Comorbidities				
• Diabetes mellitus	205 (26%)	602 (20%)	1.16 (0.94-1.43)	0.17
• Chronic kidney disease	141 (18%)	379 (13%)	1.17 (0.92-1.49)	0.20
• Liver disease	39 (5%)	85 (3%)	1.31 (0.84-2.06)	0.23
• Malignancy	24 (3%)	36 (1%)	3.49 (1.95-6.24)	<0.001
Blood culture positive for pathogenic organisms	190 (24%)	332 (11%)	2.08 (1.67-2.61)	<0.001
Year				
• 2013	165 (21%)	637 (21%)	1	0.70
• 2014	183 (23%)	651 (22%)	1.00 (0.77-1.31)	
• 2015	207 (27%)	808 (27%)	1.01 (0.77-1.33)	
• 2016[2]	224 (29%)	931 (31%)	0.89 (0.67-1.17)	

106 [1] Enrolled in the Sepsis Fast Track (SFT) programme

107 [2] Included 28 patients in 2017

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109   **Supplementary Table 7 | Factors associated with 28-day mortality using multivariable Cox**

110   **proportional hazards model in 2,170 patients enrolled into the study after the**

111   **implementation of the Sepsis Fast Track (SFT) programme**

Variables	Died (n=431)	Survived (n=1739)	Adjusted hazard ratio (95%CI)	P value
SFT group	205 (48%)	698 (40%)	0.68 (0.55-0.84)	<0.001
Male gender	254(59%)	992 (57%)	0.89 (0.73-1.09)	0.26
Age group (years) (n [%])				
• 18-40	30 (7%)	363(21%)	1	<0.001
• >40-60	125 (29%)	502 (29%)	1.97 (1.31-2.95)	
• >60-70	85 (20%)	359 (21%)	1.97 (1.28-3.03)	
• >70	191 (44%)	515 (30%)	3.33 (2.24-4.95)	
Transferred from other hospital	406 (94%)	1513 (87%)	1.49 (0.99-2.26)	0.06
Modified SOFA score (median, IQR)	7 (5-10)	4 (3-6)	1.24 (1.21-1.28)	<0.001
Comorbidities				
• Diabetes mellitus	122 (28%)	377(22%)	1.08 (0.87-1.35)	0.49
• Chronic kidney disease	84 (19%)	242 (14%)	1.23 (0.96-1.58)	0.11
• Liver disease	22 (5%)	57 (3%)	1.10 (0.71-1.70)	0.68
• Malignancy	19 (4%)	27 (2%)	2.90 (1.81-4.63)	<0.001
Blood culture positive for pathogenic organisms	110(26%)	225 (13%)	1.64 (1.31-2.05)	<0.001
Year				
• 2015	207 (48%)	808 (46%)	1	0.08
• 2016	224 (52%)	931 (54%)	0.84 (0.69-1.02)	
Direct admission to the ICU	85 (20%)	124 (7%)	1.78 (1.37-2.32)	<0.001

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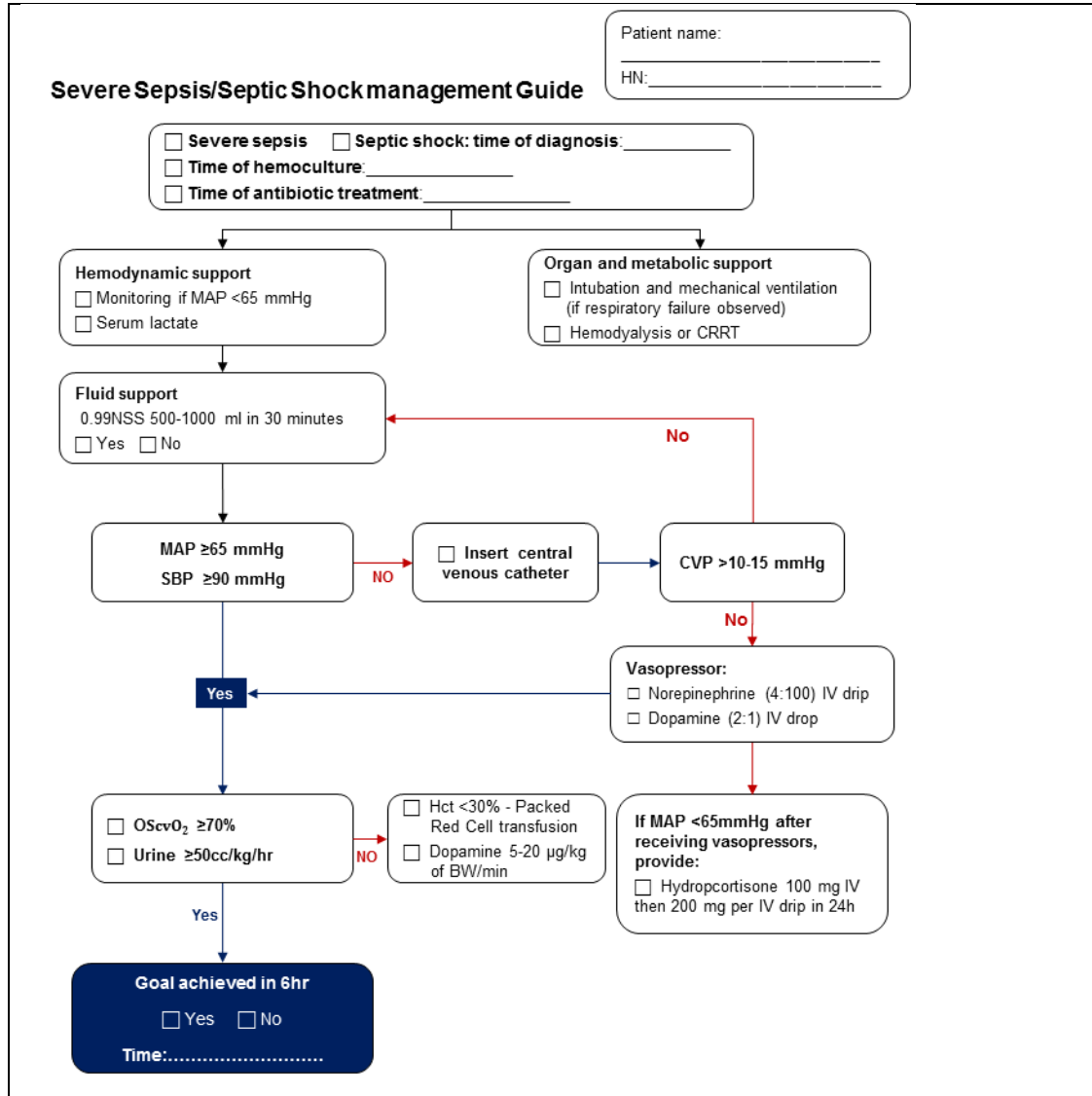
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114   **Supplementary Figure 1 | Preprinted recommended doctor orders for sepsis fast track**

115   **programme used at the Emergency Department at Sunpasitthiprasong Hospital**

116   **from 1 January 2015**

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118   **Supplementary Figure 2 | The Sepsis Fast Track sepsis resuscitation workflow used at the**

119   **Emergency Department at Sunpasitthiprasong Hospital from 1 March 2016**

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