

Supplementary information

Supplementary Table S1: General background information

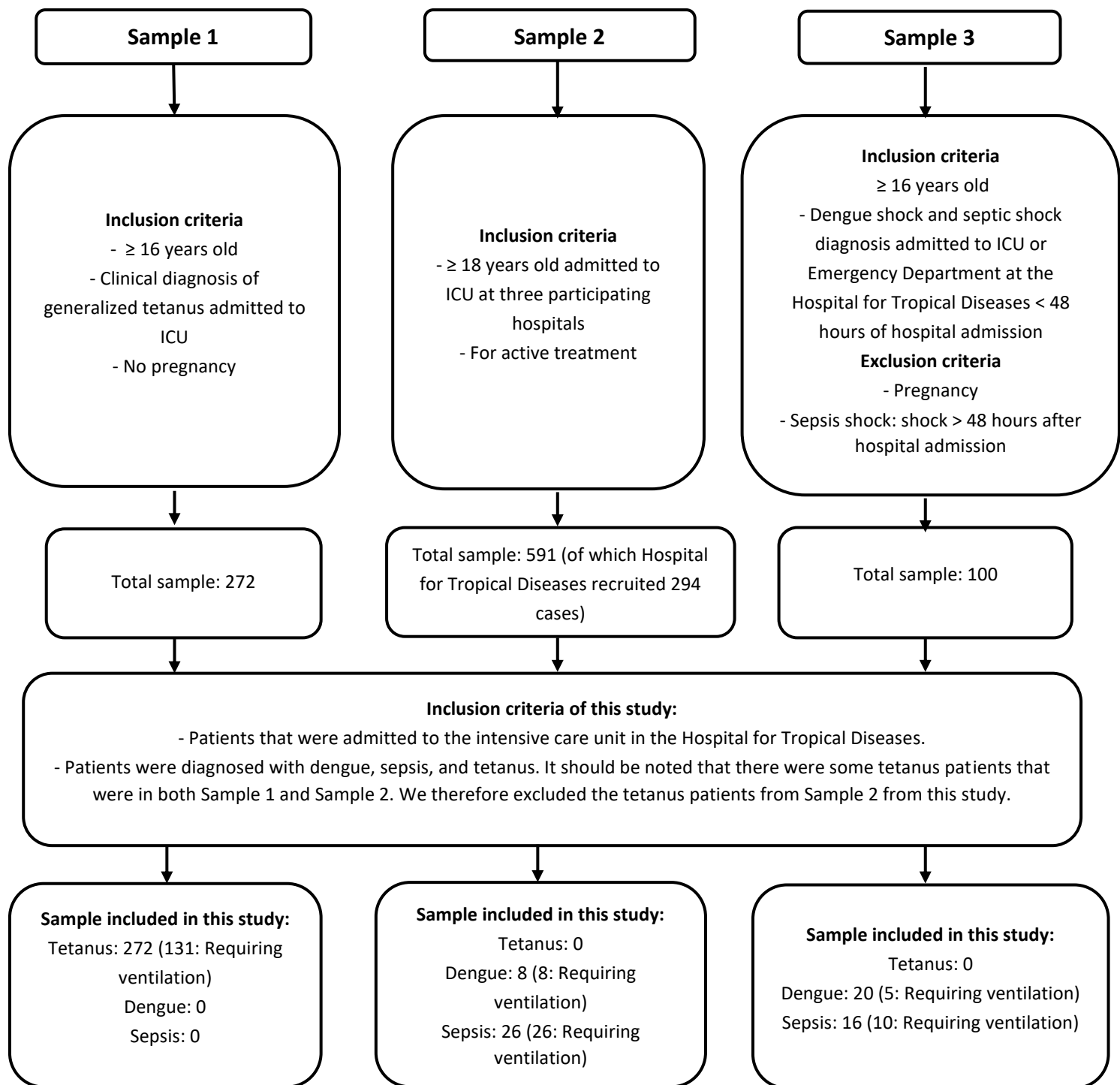
	Dengue (N=28)	Sepsis (N=42)	Tetanus (N=272)	Overall (N=342)
Gender n(%)				
Female	17 (60.7%)	12 (28.6%)	43 (15.8%)	72 (21.1%)
Male	11 (39.3%)	30 (71.4%)	229 (84.2%)	270 (78.9%)
Address n(%)				
Ho Chi Minh	12 (42.9%)	15 (35.7%)	53 (19.5%)	80 (23.4%)
Other provinces	16 (57.1%)	27 (64.3%)	219 (80.5%)	262 (76.6%)
Age				
Mean (SD)	32.2 (14.0)	52.7 (16.3)	49.1 (14.4)	48.1 (15.4)
Health insurance n(%)				
No	9 (32.1%)	12 (28.6%)	0 (0)	21 (6.1%)
Yes	19 (67.9%)	30 (71.4%)	0 (0%)	49 (14.3%)
Not available	0 (0%)	0 (0%)	272 (100%)	272 (79.5%)
Number of hospital days				
Mean (SD)	8.32 (6.57)	17.9 (14.0)	26.3 (16.5)	23.8 (16.5)
Median (Q1, Q3)	6.0 (4.0, 10.3)	15.5 (6.75, 23.8)	23.5 (17.0, 30.0)	22.0 (15.0, 29.0)
Number of ICU days				
Mean (SD)	6.0 (5.87)	13.2 (11.2)	17.7 (16.2)	16.2 (15.4)
Median (Q1, Q3)	3.5 (2.0, 8.5)	10.0 (5.3, 15.8)	15.0 (8.0, 23.0)	13.0 (7.0, 22.0)

SD: Standard deviation, Q1: 25% quartile and Q3: 75% quartile

Supplementary Table S2: The antibiotic costs relating to the ICU patients

Median cost (US\$)	Dengue		Sepsis		Tetanus	
	No mechanical ventilation [N=15]	Received mechanical ventilation [N=13]	No mechanical ventilation [N=6]	Received mechanical ventilation [N=36]	No mechanical ventilation [N=141]	Received mechanical ventilation [N=131]
Median total antibiotic cost (Q1, Q3)	0 (0;0)	267 (146; 616)	172 (155; 233)	415 (160; 783)	0.2(0.2; 0.3)	75 (0.3; 329)
Median daily ICU antibiotic cost (Q1, Q3)	0 (0, 0)	41.1 (18.4, 52.8)	36.1 (21.4, 47.0)	37.9 (13.1, 62.6)	0 (0, 0)	2.7 (0, 12.3)

Costs are in US\$ 2019 prices. Q1: 25% quartile and Q3: 75% quartile



Supplementary Figure S1: Flow-chart outlining the sample selection. Further detail regarding the primary studies from which Sample 1 and Sample 2 were taken are reported in Loan et al. (1), Dat et al. (2) respectively. Details regarding the study related to Sample 3 are not currently published.

Supplementary Box 1: Background information on the diseases investigated

Dengue is a seasonal viral disease that causes substantial health and economic burden in Vietnam (3). The Global Burden of Disease (GBD) study estimated that there were 1,038,967 dengue symptomatic cases in Vietnam in 2019 (with a 95% uncertainty interval (UI) of 812,230-1,333,874) (4). Generally, 95% of dengue cases are mild and moderate, and around 5% of hospitalized cases progress to severe disease (5). While most of the cases can be treated at any district level hospital, severe cases (such as those with dengue shock syndrome), can require intensive care and often need to be transferred to higher level hospitals. It should be noted that currently there is no specific treatment for dengue other than supportive measures (6), thus early identification of the severe manifestations of the disease and the experience of physicians play an important role in treating the patients. The following references provide the latest treatment guidelines for dengue (7, 8).

Tetanus is a vaccine-preventable bacterial disease that still commonly occurs in many low-income and middle-income countries. In Vietnam, there are currently two programs that help to prevent tetanus, the expanded Program on Immunization (EPI) and the Maternal and Neonatal Tetanus (MNT) initiative. Whilst the MNT has achieved notable success, the tetanus prevention program's impact in terms of preventing non-neonatal cases is unknown (9). There is currently no exact estimate of the incidence of tetanus in Vietnam. The number of tetanus patients admitted to Hospital for Tropical Diseases in Ho Chi Minh City varied from 250-350 patients treated annually (10). Treatment for tetanus aims to control muscle spasms, prevent toxin uptake and provide supportive care (11). Without mechanical ventilation support, the risk of mortality is high and even with such care, patients require several weeks of hospitalization (11). The following reference provides the latest treatment guidelines for tetanus in Vietnam (12).

*In contrast to dengue and tetanus, sepsis is the presence of systemic host responses to infection. Severe sepsis and septic shock are considered major healthcare problems and kill millions of people annually worldwide (13). In 2017, it was estimated that there were 312,868 sepsis cases in Vietnam (95%UI: 251,070–398,503). Among those, 187,134, 105,880, and 19,854 cases were related to infections, non-communicable diseases and injury, respectively (14). The most common pathogens found in Vietnam causing sepsis are gram-negative bacteria, such as *Klebsiella Pneumonia*, *Escherichia Coli* and *Acinetobacter Baumannii* (15-17). Monitoring sepsis and sepsis shock are commonly based on clinical symptoms and laboratory results. It is therefore challenging to diagnose and manage even in ICUs in high-income countries (18). The following reference provides the latest treatment guidelines for sepsis in Vietnam (12).*

References

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