

**Supplementary Table S1.** Admission biomarker levels by pathogen type.

Biomarker	Bacterial (n = 35)	Viral (n = 25)	Fungal (n = 2)	Mixed / Unknown (n = 18)	p value*
CRP (mg/L), median (IQR)	75 (55–110)	40 (28–60)	90 (70–110)	60 (40–85)	0.010
PCT (ng/mL), median (IQR)	5.0 (3.0–8.0)	1.5 (0.8–3.0)	7.0 (5.0–9.0)	3.0 (1.5–5.0)	< 0.001
IL-6 (pg/mL), median (IQR)	240 (170–380)	210 (140–300)	260 (200–320)	230 (160–340)	0.15
SAA (mg/L), median (IQR)	170 (120–230)	145 (100–190)	190 (150–240)	155 (110–210)	0.30
ESR (mm/h), median (IQR)	38 (28–50)	32 (22–44)	45 (35–55)	34 (26–45)	0.40
D-dimer (mg/L), median (IQR)	1.8 (1.3–2.6)	1.4 (1.0–2.0)	2.0 (1.5–2.8)	1.6 (1.1–2.3)	0.12

\*Kruskal-Wallis test

CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; IL-6, interleukin-6; IQR, interquartile range; PCT, procalcitonin; SAA, serum amyloid A.

**Supplementary Table S2.** Admission biomarker levels by primary infection site.

Biomarker	Respiratory (n = 30)	Abdominal/GI (n = 20)	Urinary-tract (n = 10)	Other/Unknown (n = 20)	p value
CRP (mg/L), median (IQR)	70 (50–100)	80 (60–115)	55 (35–75)	60 (40–85)	0.14
PCT (ng/mL), median (IQR)	4.0 (2.0–6.0)	5.0 (3.0–8.0)	3.0 (1.8–4.5)	2.8 (1.4–5.0)	0.18
IL-6 (pg/mL), median (IQR)	260 (180–400)	210 (150–310)	140 (100–200)	230 (150–330)	0.030
SAA (mg/L), median (IQR)	165 (120–230)	170 (125–240)	150 (110–210)	155 (110–210)	0.33
ESR (mm/h), median (IQR)	38 (28–50)	36 (26–47)	33 (23–42)	34 (24–45)	0.40
D-dimer (mg/L), median (IQR)	1.7 (1.2–2.5)	1.8 (1.3–2.6)	1.5 (1.0–2.1)	1.6 (1.1–2.3)	0.22

\*Kruskal-Wallis test

CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; IL-6, interleukin-6; IQR, interquartile range; PCT, procalcitonin; SAA: serum amyloid-A

**Supplementary Table S3.** Seven-day biomarker change  $\Delta(T_2-T_0)$  by pathogen type.

Biomarker	Bacterial	Viral	Fungal	Mixed / Unknown	p
$\Delta$ CRP (mg/L), median (IQR)	-55 (-70 to -40)	-35 (-50 to -25)	-60 (-80 to -40)	-45 (-60 to -30)	0.09
$\Delta$ PCT (ng/mL), median (IQR)	-4.0 (-6.0 to -2.0)	-1.0 (-2.0 to -0.5)	-5.0 (-7.0 to -3.0)	-2.0 (-3.5 to -1.0)	0.07
$\Delta$ IL-6 (pg/mL), median (IQR)	-160 (-230 to -90)	-120 (-190 to -70)	-180 (-220 to -140)	-140 (-200 to -80)	0.18
$\Delta$ SAA (mg/L), median (IQR)	-120 (-170 to -70)	-110 (-150 to -60)	-130 (-190 to -90)	-115 (-160 to -65)	0.31
$\Delta$ ESR (mm/h), median (IQR)	-10 (-18 to -5)	-8 (-15 to -4)	-12 (-18 to -6)	-9 (-16 to -4)	0.42
$\Delta$ D-dimer (mg/L), median (IQR)	-0.6 (-1.0 to -0.3)	-0.5 (-0.9 to -0.2)	-0.7 (-1.2 to -0.4)	-0.6 (-1.0 to -0.3)	0.25

 $\Delta$ , Change in; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; IL-6, interleukin-6; IQR, interquartile range; PCT, procalcitonin; SAA: serum amyloid-A

**Supplementary Table S4.** Interaction tests (effect-modification p values).

Biomarker	Pathogen × ΔBiomarker	Infection-site × ΔBiomarker
	p value	p value
CRP	0.21	0.25
PCT	0.18	0.22
IL-6	0.27	0.28
SAA	0.45	0.47
ESR	0.60	0.63
D-dimer	0.32	0.30

CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; IL-6, interleukin-6; PCT, procalcitonin; SAA: serum amyloid-A

**Supplementary Table S5.** pSOFA trajectory over the first week

Time-point	Mean ± SD	Median (IQR)
T0 (Admission)	3.8 ± 1.5	4 (3–5)
T1 (72 h)	2.9 ± 1.4	3 (2–4)
T2 (Day 7)	1.9 ± 1.2	2 (1–3)

IQR, interquartile range; pSOFA, pediatric Sequential Organ Failure Assessment; SD, standard deviation.

**Supplementary Table S6.** Log-scale sensitivity analysis (Δln biomarker vs. ΔpSOFA).

Biomarker	Δln (T2–T0) Median (IQR)	Spearman r with ΔpSOFA	p-value	Adjusted β (95% CI)*	p-value	AUC for pSOFA ≤ 2
CRP	-1.18 (-1.61 to -0.92)	-0.46	0.001	-0.06 (-0.11 to -0.01)	0.016	0.81
PCT	-1.25 (-1.75 to -0.78)	-0.51	<0.001	-0.08 (-0.13 to -0.03)	0.004	0.84
IL-6	-1.80 (-2.31 to -1.21)	-0.56	<0.001	-0.34 (-0.50 to -0.18)	<0.001	0.90
SAA	-1.14 (-1.55 to -0.70)	-0.34	0.005	-0.05 (-0.10 to 0.00)	0.065	0.77
ESR	-0.29 (-0.46 to -0.11)	-0.20	0.080	-0.02 (-0.05 to 0.01)	0.21	0.69
D-dimer	-0.81 (-1.20 to -0.49)	-0.44	0.002	-0.07 (-0.12 to -0.02)	0.011	0.79

Δ, Change in; AUC, area under the curve; CI, confidence interval; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; IL-6, interleukin-6; IQR, interquartile range; PCT, procalcitonin; pSOFA, pediatric Sequential Organ Failure Assessment; SAA: serum amyloid-A.

\*β indicates change in ΔpSOFA per 1-unit decrease in ln(biomarker); models adjusted for age.

**Supplementary Table S7.** Optimal admission cut-offs (Youden index) for adverse outcome.

Biomarker	Optimal cut-off	AUC (95% CI)	Sensitivity	Specificity
CRP	≥ 60 mg/L	0.78 (0.68–0.88)	72%	76%
PCT	≥ 3.0 ng/mL	0.82 (0.72–0.91)	76%	78%
IL-6	≥ 200 pg/mL	0.86 (0.77–0.94)	80%	82%
D-dimer	≥ 1.5 mg/L	0.75 (0.64–0.85)	70%	71%

AUC, area under the curve; CI, confidence interval; CRP, C-reactive protein; IL-6, interleukin-6; PCT, procalcitonin.