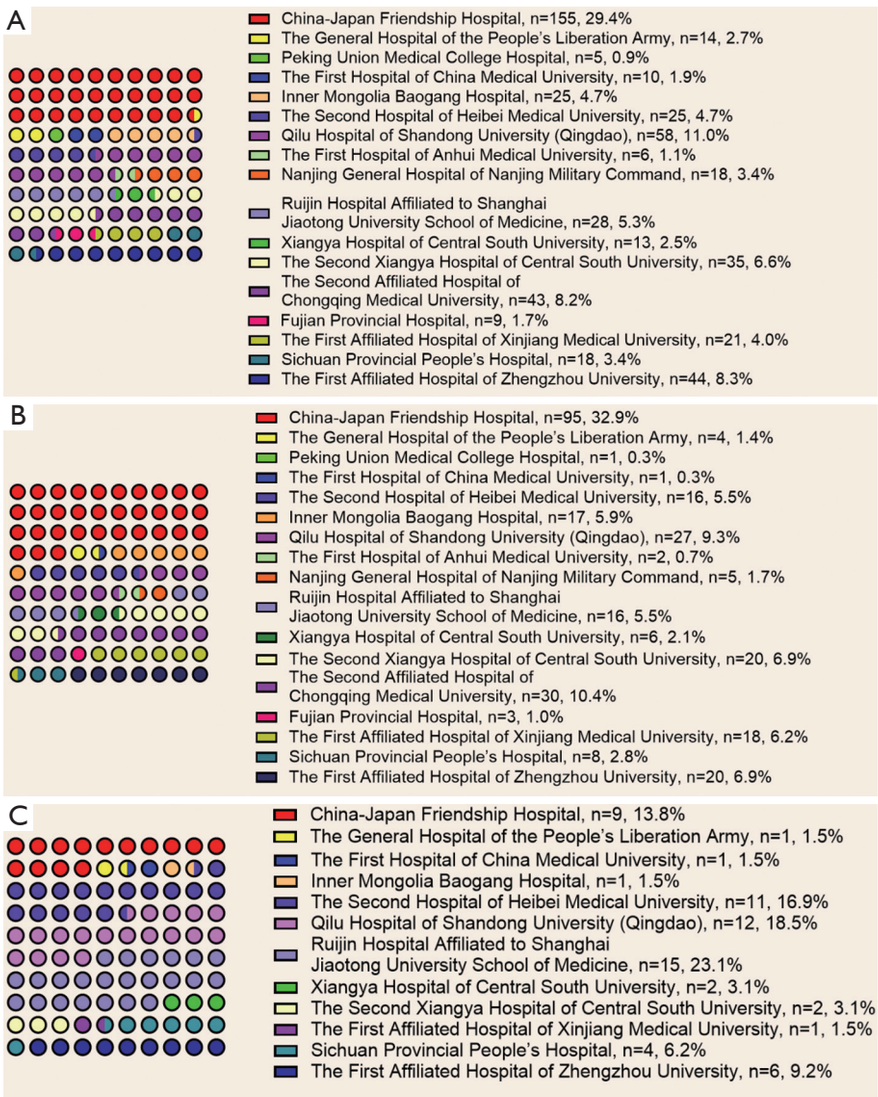

Figure S1 (A) The distribution of patients in 17 participating hospitals (n=527). (B) The distribution of low-dose corticosteroid and control groups in different hospitals (n=289). (C) The distribution of the low-dose corticosteroid group in different hospitals (n=65).

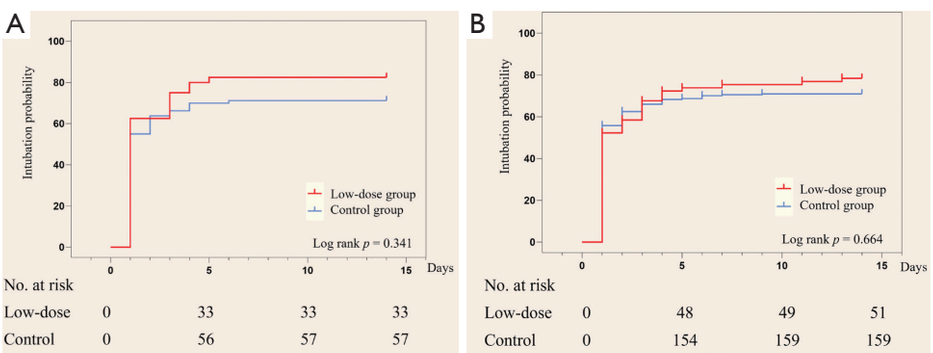

Figure S2 Intubation rate curves for the low-dose and control groups within a 14-day period in the matched sample (A) and original sample (B).

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Table S1 Distribution of acute respiratory distress syndrome risk factors in the low-dose and control groups. There was no significant difference between two groups (P=0.433)

Risk factor	Low-dose corticosteroid (n=65), n (%)	Non-corticosteroid (n=224), n (%)
Pneumonia	52 (81.3)	167 (74.6)
Aspiration	5 (7.8)	7 (3.1)
Drowning	0	1 (0.4)
Pulmonary contusion	1 (1.6)	6 (2.7)
Trauma	0	5 (2.2)
Extrapulmonary sepsis	3 (4.7)	18 (8.0)
Pancreatitis	1 (1.6)	10 (4.5)
Others	2 (3.1)	10 (4.5)
Missing data	1 (1.5)	0

Table S2 Aetiological diagnoses in patients with pneumonia-related acute respiratory distress syndrome in the low-dose and control groups. There was no significant difference between two groups (P=0.574)

Pathogen	Low-dose corticosteroid (n=52), n (%)	Non-corticosteroid (n=167), n (%)
Gram– bacillus	3 (5.7)	15 (8.9)
Gram+ coccus	0	1 (0.6)
Fungus	1 (1.9)	6 (3.6)
Influenza virus	10 (19.2)	38 (22.8)
Other viruses	2 (3.9)	2 (1.2)
Pneumocystis	2 (3.9)	1 (0.6)
Tuberculosis bacillus	0	1 (0.6)
Atypical pathogens	0	4 (2.4)
Mixed infection	5 (9.6)	20 (12.0)
Unknown	29 (55.8)	79 (47.3)

Table S3 Comparison of baseline characteristics between high-dose and control groups

Variable	High-dose corticosteroid (n=65)	Non-corticosteroid (n=224)	P value
Male sex, n (%)	45 (69.2)	156 (69.6)	0.949
Age, median (IQR), years	58.0 (44.0–70.0)	57.0 (45.0–69.0)	0.874
BMI, median (IQR)	24.2 (22.0–26.2)	24.2 (21.5–26.7)	0.776
PFR at admission (mmHg)	107.0 (80.0–162.8)	115.2 (84.3–162.0)	0.695
APACHE II score, median (IQR)	17 (10–23)	15 (10–21)	0.240
SOFA score, median (IQR)	7 (4–9)	6 (4–10)	0.972
Intrapulmonary ARDS, n (%)	60 (92.3)	182 (81.3)	0.033
Underlying disease condition, n (%)			
Hypertension	24 (36.9)	65 (29.3)	0.241
Diabetes mellitus	14 (21.5)	43 (19.4)	0.700
Chronic cardiac insufficiency	3 (4.6)	8 (3.6)	0.716
Chronic kidney disease	6 (9.2)	20 (9.0)	0.956
Immunosuppression*	32 (49.2)	39 (17.4)	0.000
Laboratory test results at ICU admission			
D0 WBC, median (IQR) ($\times 10^9$/L)	11.3 (8.9–16.4)	10.0 (6.3–15.3)	0.150
D0 PCT, median (IQR) (ng/mL)	1.1(0.3–5.0)	2.0 (0.4–10.5)	0.077
D0 CRP, median (IQR) (mg/L)	130.1 (60.7–211.7)	124.7 (42.4–200.0)	0.648
D0 lactic acid, median (IQR) (mmol/L)	1.9 (1.2–2.7)	1.8 (1.1–2.8)	0.905

*, immunosuppression was defined as a haematologic malignancy or a solid tumour; or administration of steroids or any immunosuppressive drug within a month; or administration of radiation therapy or chemotherapy within a year (Same as *Table 1*).

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Table S4 Comparison of baseline characteristics between other dose corticosteroid group and control groups

Variable	Other-dose corticosteroid (n=189)	Non-corticosteroid (n=224)	P value
Male sex, n (%)	137 (72.5)	156 (69.6)	0.526
Age, median (IQR), years	55.0 (43.0–68.0)	57.0 (45.0–69.0)	0.666
BMI, median (IQR)	24.0 (21.7–26.1)	24.2 (21.5–26.7)	0.458
PFR at admission (mmHg)	110.5 (74.0–160.0)	113.0 (84.1–160.1)	0.310
APACHE II score, median (IQR)	18.0 (13.0–23.5)	15.0 (10.0-21.0)	0.002
SOFA score, median (IQR)	8.0 (5.0–11.0)	6.0 (4.0–10.0)	0.002
Intrapulmonary ARDS, n (%)	158 (83.6)	182 (81.3)	0.533
Underlying disease condition, n (%)			
Hypertension	70 (37.0)	65 (29.3)	0.095
Diabetes mellitus	39 (20.7)	43 (19.4)	0.729
Chronic cardiac insufficiency	12 (6.3)	8 (3.6)	0.197
Chronic kidney disease	22 (11.7)	20 (9.0)	0.370
Immunosuppression*	67 (35.4)	39 (17.4)	0.000
Laboratory test results at ICU admission			
D0 WBC, median (IQR) ($\times 10^9$/L)	10.6 (5.7–13.9)	10.4 (6.3–15.3)	0.910
D0 PCT, median (IQR) (ng/mL)	0.9 (0.3–5.0)	2.0 (0.4–10.5)	0.052
D0 CRP, median (IQR) (mg/L)	107.8 (39.3–180.4)	124.7 (46.8–200.0)	0.114
D0 lactic acid, median (IQR) (mmol/L)	1.9 (1.3–2.8)	1.8 (1.1–2.8)	0.468

*, immunosuppression was defined as a haematologic malignancy or a solid tumour; or administration of steroids or any immunosuppressive drug within a month; or administration of radiation therapy or chemotherapy within a year (Same as *Table 1*).

Table S5 Comparison of outcomes between the low-dose and control groups in the original sample

Outcome	Low-dose corticosteroid (n=65)	Non-corticosteroid (n=224)	P value
Duration of mechanical ventilation* (days)	11.0 (7.0–14.0)	8.0 (5.0–12.0)	0.001
Nosocomial infection, n (%)	14 (21.5)	59 (26.3)	0.433
New organ failure, n (%)	27 (41.5)	94 (42.0)	0.951
Ventilator free days at day 28, d	14.0 (1.5–19.5)	17.0 (1.0–27.8)	0.188
ICU length of stay (days)	15.5 (10.0–24.0)	10.0 (6.0–17.0)	0.000
Hospital length of stay (days)	23.0 (16.0–36.3)	17.0 (10.0–26.0)	0.000
ICU mortality, n (%)	28 (43.1)	87 (38.8)	0.539
Hospital mortality, n (%)	29 (44.6)	91 (40.6)	0.565

*, Only patients with intubation were included.

Table S6 Comparison of outcomes between the high-dose and control groups

Outcome	High-dose corticosteroid (n=41)	Non-corticosteroid (n=224)	P value
Duration of mechanical ventilation* (days)	10.0 (4.0–14.0)	10.0 (5.0–13.6)	0.378
Nosocomial infection, n (%)	9 (22.0)	59 (26.3)	0.554
New organ failure, n (%)	15 (36.6)	94 (42.0)	0.520
Ventilator free days at day 28 (days)	16.0 (0.5–28.0)	17.0 (1.0–27.3)	0.581
ICU length of stay (days)	14.0 (7.5–35.0)	10.0 (6.0–17.0)	0.001
Hospital length of stay (days)	23.0 (12.5–26.0)	17.0 (10.0–26.0)	0.002
ICU mortality, n (%)	16 (39.0)	87 (38.8)	0.982
Hospital mortality, n (%)	17 (41.5)	91 (40.6)	0.920

*, Only patients with intubation were included.

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Table S7 Comparison of outcomes between the other dose corticosteroid group and control groups

Outcome	Other dose corticosteroid (n=189)	Non-corticosteroid (n=224)	P value
Duration of mechanical ventilation* (days)	7.0 (3.0–11.0)	5.0 (0.0–10.0)	0.024
Nosocomial infection, n (%)	49 (25.9)	59 (26.3)	0.924
New organ failure, n (%)	101 (53.4)	94 (42.0)	0.020
Ventilator free days at day 28 (days)	4.0 (0.0–21.0)	17.0 (1.0–27.8)	0.000
ICU length of stay (days)	11.0 (6.0–21.0)	10.0 (6.0–17.0)	0.063
Hospital length of stay (days)	17.0 (8.8–30.3)	17.0 (10.0–26.0)	0.444
ICU mortality, n (%)	96 (50.8)	87 (38.8)	0.015
Hospital mortality, n (%)	101 (53.4)	91 (40.6)	0.009

*, Only patients with intubation were included.

Table S8. Univariate Cox regression analysis for factors associated with hospital mortality in original sample

Variable	HR (95% CI)	p value
Age⩾65 years	1.71(1.19-2.46)	.004
Male	1.06(0.71-1.59)	.763
SOFA≥6	1.66(1.11-2.49)	.013
ARDS Severity	1.27(0.95-1.71)	.108
Intrapulmonary ARDS	1.30(0.77-2.21)	.326
Immunosuppression	1.68(1.15-2.44)	.007
Low-dose corticosteroid	0.82(0.54-1.25)	.348

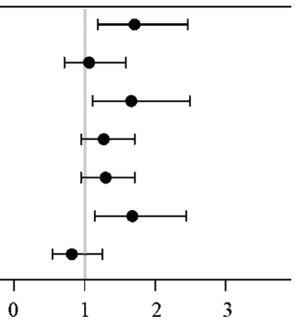

Table S9. Multivariate Cox regression analysis for factors associated with hospital mortality in original sample

Variable	HR (95% CI)	p value
Age⩾65 years	1.58(1.09-2.28)	.016
Male	1.02(0.67-1.55)	.930
SOFA≥6	1.64(1.09-2.47)	.018
ARDS Severity	1.29(0.96-1.72)	.095
Intrapulmonary ARDS	1.45(0.84-2.50)	.181
Immunosuppression	1.58(1.05-2.39)	.029
Low-dose corticosteroid	0.62(0.39-0.98)	.041

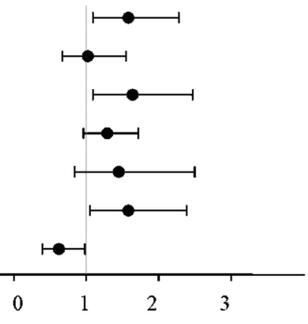

Table S10 Effects of corticosteroids on mortality using multivariate Cox regression analysis in the original sample

Subgroup	Hospital mortality	
	HR (95% CI)	P
All patients (n=289)	0.63 (0.39–0.98)	0.041
Patients with intrapulmonary ARDS (n=242)	0.55 (0.34–0.90)	0.017
Patients with mechanical ventilation (n=209)	0.55 (0.34–0.91)	0.019
Patients with shock (n=97)	0.64 (0.35–1.18)	0.635
Patients with influenza (n=48)	0.27 (0.07–1.03)	0.056
Patients without immunosuppression (n=218)	0.41 (0.20–0.87)	0.020

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