

Supplementary Table 1. Unit cost of remdesivir medication and healthcare services

Medication / Health Service	Cost (HK\$)	Cost (US\$) [†]
Remdesivir, per vial	3,042	390
Dexamethasone, per 10 days	94	12
Hospitalization, per day		
General Ward	5,100	654
Intensive Care Unit	24,400	3,128
Emergency department, per visit	1,230	158
Polymerase chain reaction tests	240	31
Extracorporeal membrane oxygenation (ECMO) catheter insertion	52,100	6,679
ECMO	80,175	10,279
Tracheostomy	16,050	2,058
Hemodialysis	9,410	1,206
Peritoneal dialysis	9,410	1,206

Data sources:

Gilead Sciences I. An Open Letter from Daniel O’Day, Chairman & CEO, Gilead Sciences. Available at: <https://www.gilead.com/news-and-press/press-room/press-releases/2020/6/an-open-letter-from-daniel-oday-chairman--ceo-gilead-sciences>. Accessed 28/05/2021.

Hospital Authority. Hospital Authority Ordinance (Chapter 113) - Revision to list of charges, 2017.

Notes:

ECMO = extracorporeal membrane oxygenation

[†] A fixed exchange rate of 1 US\$ = 7.8 HK\$

Supplementary Table 2. Data completion rates of baseline characteristics before multiple imputation

Characteristics	Total (N = 1,544)	Remdesivir- Dexamethasone (N=466)	Dexamethasone (N=1,078)
Age	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Sex	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Period	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Pre-existing comorbidities on admission			
Charlson Comorbidity Index	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Diabetes mellitus	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Hypertension	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Liver disease	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Chronic lung disease	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Chronic heart disease	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Chronic kidney disease	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Malignancy	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Long-term medications			
ACEI or ARB	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Anticoagulant	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Antiplatelet	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Lipid-lowering agent	100.0% (1,544)	100.0% (466)	100.0% (1,078)
NSAID	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Time from admission to remdesivir initiation, days	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Cumulative dosage of remdesivir, mg	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Duration of use of remdesivir, days	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Time from admission to dexamethasone initiation, days	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Administration route of dexamethasone	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Dosage of dexamethasone	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Cumulative dosage of dexamethasone, mg	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Duration of use of dexamethasone, days	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Treatment performed prior to dexamethasone initiation			
Remdesivir	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Interferon- β -1b	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Ribavirin	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Tocilizumab	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Baricitinib	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Other systemic steroids	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Drug initiation sequence	100.0% (1,544)	100.0% (466)	100.0% (1,078)
ECMO	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Invasive mechanical ventilation	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Non-invasive mechanical ventilation	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Dialysis	100.0% (1,544)	100.0% (466)	100.0% (1,078)

ICU admission	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Admission via emergency department	100.0% (1,544)	100.0% (466)	100.0% (1,078)
WHO Clinical Progression Scale on admission	100.0% (1,544)	100.0% (466)	100.0% (1,078)
Laboratory parameters on admission			
White blood cell	99.5% (1,537)	99.6% (464)	99.5% (1,073)
Neutrophil	99.4% (1,535)	99.6% (464)	99.4% (1,071)
Lymphocyte	99.4% (1,535)	99.6% (464)	99.4% (1,071)
Platelet	99.5% (1,536)	99.6% (464)	99.4% (1,072)
Lactate dehydrogenase	98.2% (1,516)	98.9% (461)	97.9% (1,055)
Creatine kinase	87.6% (1,352)	91.0% (424)	86.1% (928)
Total bilirubin	99.7% (1,539)	100.0% (466)	99.5% (1,073)
C-reactive protein	98.9% (1,527)	99.8% (465)	98.5% (1,062)
Cycle threshold value	97.3% (1,502)	99.4% (463)	96.4% (1,039)
eGFR	99.8% (1,541)	100.0% (466)	99.7% (1,075)
ALP	98.1% (1,515)	98.3% (458)	98.1% (1,057)
ALT	99.7% (1,539)	100.0% (466)	99.5% (1,073)
Hemoglobin	99.5% (1,537)	99.6% (464)	99.5% (1,073)

Notes: ACEI = angiotensin converting enzyme inhibitor; ALP = alkaline phosphatase; ALT = alanine transaminase; ARB = angiotensin receptor blocker; ECMO = extracorporeal membrane oxygenation; eGFR = estimated glomerular filtration rate; ICU = intensive care unit; NSAID = non-steroidal anti-inflammatory drug

Supplementary Table 3. Baseline characteristics of hospitalized patients with COVID-19 who initiated remdesivir prior to, on the same day, or later than dexamethasone initiation, and those who had not initiated remdesivir

Baseline characteristics	Remdesivir prior to dexamethasone (n=93)		Co-initiating remdesivir and dexamethasone on the same day (n=373)		Remdesivir later than dexamethasone (n=149)		Non-remdesivir users (n=929)	
	N / Mean	% / SD	N / Mean	% / SD	N / Mean	% / SD	N / Mean	% / SD
Age, years †	66.1	12.2	64.5	12.6	65.6	13.6	64.1	14.6
≤65	46	(49.5%)	180	(48.3%)	76	(51.0%)	501	(53.9%)
>65	47	(50.5%)	193	(51.7%)	73	(49.0%)	428	(46.1%)
Sex								
Male	57	(61.3%)	207	(55.5%)	91	(61.1%)	537	(57.8%)
Female	36	(38.7%)	166	(44.5%)	58	(38.9%)	392	(42.2%)
Period								
21st January 2020 - 30th November 2020	17	(18.3%)	47	(12.6%)	59	(39.6%)	658	(70.8%)
1st December 2020 - 31st January 2021	76	(81.7%)	326	(87.4%)	90	(60.4%)	271	(29.2%)
Pre-existing comorbidities								
Charlson Comorbidity Index †‡	4.7	1.9	4.7	2.0	5.0	2.1	4.9	2.3
1-4	50	(53.8%)	187	(50.1%)	64	(43.0%)	459	(49.5%)
5-6	28	(30.1%)	128	(34.3%)	54	(36.2%)	278	(30.0%)
7-14	15	(16.1%)	58	(15.6%)	31	(20.8%)	191	(20.6%)
Diabetes mellitus	37	(39.8%)	157	(42.1%)	73	(49.0%)	328	(35.3%)
Hypertension	55	(59.1%)	240	(64.3%)	104	(69.8%)	511	(55.0%)
Liver disease	6	(6.5%)	50	(13.4%)	20	(13.4%)	114	(12.3%)
Chronic lung disease	10	(10.8%)	47	(12.6%)	21	(14.1%)	105	(11.3%)
Chronic heart disease	15	(16.1%)	45	(12.1%)	23	(15.4%)	177	(19.1%)
Chronic kidney disease	5	(5.4%)	41	(11.0%)	22	(14.8%)	187	(20.1%)
Malignancy	2	(2.2%)	9	(2.4%)	6	(4.0%)	26	(2.8%)
Long-term medications								
ACEI/ARB	28	(30.1%)	115	(30.8%)	54	(36.2%)	230	(24.8%)
Anticoagulant	41	(44.1%)	215	(57.6%)	111	(74.5%)	360	(38.8%)
Antiplatelet	15	(16.1%)	63	(16.9%)	26	(17.4%)	174	(18.7%)

Lipid-lowering agent	36	(38.7%)	135	(36.2%)	68	(45.6%)	283	(30.5%)
NSAID	16	(17.2%)	73	(19.6%)	35	(23.5%)	209	(22.5%)
Time from admission to remdesivir initiation, days †	3.2	3.2	3.7	3.2	6.0	3.7	NA	NA
Cumulative dosage of remdesivir, mg †	543.0	241.6	609.1	232.7	604.7	219.1	NA	NA
Duration of use of remdesivir, days †	3.7	2.1	4.4	2.0	4.5	1.9	NA	NA
Time from admission to dexamethasone initiation, days †	5.8	3.9	3.7	3.2	3.3	2.9	4.7	4.2
Administration route of dexamethasone								
Oral	17	(18.3%)	47	(12.6%)	43	(28.9%)	240	(25.8%)
Intravenous injection	76	(81.7%)	326	(87.4%)	106	(71.1%)	689	(74.2%)
Dosage of dexamethasone								
Up to 6mg daily	39	(41.9%)	146	(39.1%)	58	(38.9%)	460	(49.5%)
More than 6mg daily	54	(58.1%)	227	(60.9%)	91	(61.1%)	469	(50.5%)
Cumulative dosage of dexamethasone, mg †	37.6	35.3	55.0	74.1	73.2	57.7	49.8	50.1
Duration of use of dexamethasone, days †	5.2	5.3	7.9	11.0	10.4	8.2	8.0	8.2
Treatment performed prior to dexamethasone initiation								
Remdesivir	93	(100.0%)	373	(100.0%)	0	(0.0%)	NA	NA
Interferon-β-1b	64	(68.8%)	191	(51.2%)	118	(79.2%)	761	(81.9%)
Ribavirin	30	(32.3%)	109	(29.2%)	75	(50.3%)	368	(39.6%)
Tocilizumab	0	(0.0%)	2	(0.5%)	3	(2.0%)	22	(2.4%)
Baricitinib	1	(1.1%)	4	(1.1%)	1	(0.7%)	3	(0.3%)
Other systemic steroids	2	(2.2%)	10	(2.7%)	4	(2.7%)	41	(4.4%)
ECMO	0	(0.0%)	1	(0.3%)	1	(0.7%)	1	(0.1%)
Invasive mechanical ventilation	6	(6.5%)	57	(15.3%)	43	(28.9%)	85	(9.1%)
Non-invasive mechanical ventilation	0	(0.0%)	13	(3.5%)	11	(7.4%)	21	(2.3%)
Dialysis	0	(0.0%)	4	(1.1%)	1	(0.7%)	10	(1.1%)
ICU admission	16	(17.2%)	96	(25.7%)	63	(42.3%)	149	(16.0%)
Admission via emergency department	29	(31.2%)	167	(44.8%)	84	(56.4%)	586	(63.1%)
WHO Clinical Progression Scale Score (range 0-10) †	4.5	0.9	4.8	1.1	5.2	1.0	4.5	0.9
ARDS	0	(0.0%)	25	(6.7%)	9	(6.0%)	29	(3.1%)
Laboratory parameters [normal range] †								
White blood cell, ×10 ⁹ /L [3.7-9.2 ×10 ⁹ /L]	5.5	1.9	5.8	2.5	5.7	2.6	5.7	2.5
Neutrophil, ×10 ⁹ /L [1.7-5.8 ×10 ⁹ /L]	4.0	2.1	4.3	2.4	4.1	2.5	4.2	2.4

Lymphocyte, $\times 10^9/L$ [1.0-3.1 $\times 10^9/L$]	1.0	0.5	1.0	0.5	1.0	0.4	1.0	0.4
Platelet, $\times 10^9/L$ [145-370 $\times 10^9/L$]	176.0	59.8	183.2	61.4	163.5	46.3	189.2	75.8
Lactate dehydrogenase, U/L [110-210 U/L]	318.6	98.5	338.0	146.8	326.4	139.1	317.8	142.5
Creatine kinase, U/L [26-192 U/L]	189.0	239.8	294.2	499.2	363.2	522.4	236.2	513.6
Total bilirubin, $\mu\text{mol/L}$ [5-27 $\mu\text{mol/L}$]	9.9	6.4	9.4	6.7	9.4	4.3	10.1	7.5
C-reactive protein, mg/L [<5 mg/L]	55.9	48.8	65.1	55.3	63.2	59.9	58.2	54.7
Cycle threshold value, cycle	22.4	5.7	23.3	4.9	22.4	5.0	25.0	5.5
eGFR, ml/min/1.73m ² [>90 ml/min/1.73m ²]	102.6	67.4	105.1	57.3	104.3	84.8	102.9	60.7
ALP, U/L [30-120 U/L]	67.4	25.8	69.3	34.1	70.2	33.2	74.4	59.1
ALT, U/L [<46.5 U/L]	33.8	23.9	38.2	25.7	34.4	20.7	39.8	43.0
Hemoglobin, g/dL [13.4-17.1 g/dL]	13.3	1.8	13.3	1.5	13.4	1.8	13.2	1.8

Notes:

ACEI = angiotensin converting enzyme inhibitor; ALP = alkaline phosphatase; ALT = alanine transaminase; ARB = angiotensin receptor blocker; ARDS = acute respiratory distress syndrome; ECMO = extracorporeal membrane oxygenation; eGFR = estimated glomerular filtration rate; ICU = intensive care unit; NSAID = non-steroidal anti-inflammatory drug; SD = standard deviation

† Age, Charlson Comorbidity Index, clinical severity, cumulative dosage, duration of use of dosage, time from admission to dexamethasone initiation, and laboratory parameters on admission are presented in mean \pm SD

‡ The calculation of Charlson Comorbidity Index does not include Acquired Immune Deficiency Syndrome (AIDS)

Supplementary Table 4. Number and incidence rate of outcome events

Event	Before weighting							After weighting	
	Cumulative incidence		Crude incidence rate (Events / 100 person-days)			Median follow-up periods (Days)	Mean follow-up periods (Days)	Incidence rate (Events / 100 person-days)	
	Cases with event	Rate	Estimate	95% CI*	Person- days			Estimate	95% CI*
Total (N = 1544)									
Clinical improvement on WHO clinical progression scale by ≥ 1 score	1379	0.8931	4.267	(4.045, 4.498)	32317	13	21	4.583	(4.416, 4.754)
Hospital discharge (score ≤ 3)	1361	0.8815	3.991	(3.781, 4.208)	34105	13	22	4.213	(4.058, 4.371)
Recovery (score ≤ 4)	376	0.7596	2.199	(1.983, 2.433)	17097	23	35	2.212	(2.053, 2.378)
In-hospital death or invasive mechanical ventilation (score ≥ 7)	264	0.1752	1.067	(0.942, 1.204)	24736	12	16	0.921	(0.838, 1.010)
In-hospital death or invasive mechanical ventilation (score ≥ 7) or intensive care unit admission	224	0.1563	0.965	(0.843, 1.100)	23212	12	16	0.837	(0.755, 0.925)
In-hospital death (score = 10)	161	0.1043	0.472	(0.402, 0.551)	34105	13	22	0.414	(0.366, 0.465)
Viral clearance (first negative PCR result)	479	0.3195	2.015	(1.839, 2.204)	23768	12	16	2.132	(2.003, 2.267)
Low viral load (Ct value ≥ 35)	465	0.3121	1.936	(1.764, 2.120)	24020	11	16	2.018	(1.892, 2.149)
IgG antibody	1068	0.9328	12.710	(11.959, 13.495)	8403	6	7	12.904	(12.364, 13.460)
ARDS	132	0.0891	0.494	(0.414, 0.586)	26695	12	18	0.501	(0.442, 0.565)
Remdesivir-Dexamethasone (N = 466)									
Clinical improvement on WHO clinical progression scale by ≥ 1 score	429	0.9206	4.755	(4.315, 5.226)	9023	12	19	5.204	(4.938, 5.476)
Hospital discharge (score ≤ 3)	422	0.9056	4.230	(3.836, 4.653)	9977	13	21	4.616	(4.381, 4.861)
Recovery (score ≤ 4)	122	0.7922	2.216	(1.840, 2.646)	5506	27	36	2.232	(2.001, 2.481)
In-hospital death or invasive mechanical ventilation (score ≥ 7)	65	0.1451	0.916	(0.707, 1.168)	7093	11	16	0.741	(0.630, 0.860)
In-hospital death or invasive mechanical ventilation (score ≥ 7) or intensive care unit admission	47	0.1127	0.736	(0.541, 0.979)	6384	11	15	0.657	(0.550, 0.775)
In-hospital death (score = 10)	36	0.0773	0.361	(0.253, 0.500)	9977	13	21	0.309	(0.250, 0.377)
Viral clearance (first negative PCR result)	149	0.3268	2.041	(1.726, 2.396)	7302	12	16	2.438	(2.239, 2.650)
Low viral load (Ct value ≥ 35)	143	0.3129	1.997	(1.683, 2.353)	7160	11	16	2.226	(2.035, 2.428)
IgG antibody	329	0.9705	14.218	(12.723, 15.840)	2314	5	7	13.814	(13.000, 14.660)
ARDS	47	0.1066	0.616	(0.452, 0.819)	7635	11	17	0.510	(0.424, 0.607)

Dexamethasone (N = 1078)

Clinical improvement on WHO clinical progression scale by ≥ 1 score	950	0.8813	4.078	(3.823, 4.346)	23294	13	22	4.073	(3.861, 4.292)
Hospital discharge (score ≤ 3)	939	0.8711	3.892	(3.647, 4.149)	24128	13	22	3.859	(3.656, 4.067)
Recovery (score ≤ 4)	254	0.7449	2.191	(1.930, 2.478)	11591	22	34	2.195	(1.980, 2.425)
In-hospital death or invasive mechanical ventilation (score ≥ 7)	199	0.1879	1.128	(0.977, 1.296)	17643	12	17	1.074	(0.952, 1.205)
In-hospital death or invasive mechanical ventilation (score ≥ 7) or intensive care unit admission	177	0.1742	1.052	(0.903, 1.219)	16828	12	17	0.988	(0.867, 1.117)
In-hospital death (score = 10)	125	0.1160	0.518	(0.431, 0.617)	24128	13	22	0.506	(0.434, 0.585)
Viral clearance (first negative PCR result)	330	0.3164	2.004	(1.794, 2.232)	16466	12	16	1.856	(1.691, 2.032)
Low viral load (Ct value ≥ 35)	322	0.3117	1.910	(1.707, 2.130)	16860	12	16	1.830	(1.666, 2.005)
IgG antibody	739	0.9169	12.137	(11.277, 13.044)	6089	6	8	12.100	(11.382, 12.841)
ARDS	85	0.0817	0.446	(0.356, 0.551)	19060	12	18	0.493	(0.413, 0.581)

Notes: ARDS = acute respiratory distress syndrome; CI = confidence interval; Ct = cycle threshold; IgG = immunoglobulin G; PCR = polymerase chain reaction

* 95% CI of incidence rates were constructed by Poisson distribution

Supplementary Table 5. Sensitivity analyses on the study outcomes

	Before weighting		After weighting		
	Remdesivir-Dexamethasone	Dexamethasone	Remdesivir-Dexamethasone vs Dexamethasone		
	% (N)	% (N)	HR†	95% CI	P-value
Clinical improvement on WHO clinical progression scale by ≥ 1 score					
Removing hospital discharge as censoring criteria	92.1% (466)	77.1% (1,078)	1.23	(1.02, 1.48)	0.030
At most 90 days of follow-up period	91.4% (466)	86.1% (1,078)	1.23	(1.02, 1.49)	0.030
Perform complete-case using the IPTW	92.3% (413)	88.4% (872)	1.21	(1.06, 1.37)	0.004
Hospital discharge (score ≤ 3)					
Removing hospital discharge as censoring criteria	90.6% (466)	76.0% (1,078)	1.20	(1.00, 1.45)	0.053
At most 90 days of follow-up period	89.5% (466)	84.9% (1,078)	1.18	(0.97, 1.44)	0.090
Perform complete-case using the IPTW	90.6% (413)	87.2% (872)	1.16	(1.02, 1.33)	0.025
Recovery (score ≤ 4)					
Removing hospital discharge as censoring criteria	79.2% (154)	55.7% (341)	1.05	(0.79, 1.40)	0.734
At most 90 days of follow-up period	76.6% (154)	69.5% (341)	0.93	(0.71, 1.22)	0.594
Perform complete-case using the IPTW	78.0% (127)	75.1% (293)	0.96	(0.77, 1.20)	0.734
Viral clearance (first negative PCR result)					
Removing hospital discharge as censoring criteria	32.7% (456)	26.0% (1,043)	1.35	(0.95, 1.92)	0.093
At most 90 days of follow-up period	32.7% (456)	31.5% (1,043)	1.29	(0.93, 1.79)	0.126
Perform complete-case using the IPTW	32.2% (404)	30.5% (846)	1.17	(0.93, 1.48)	0.172
Low viral load (Ct value ≥ 35)					
Removing hospital discharge as censoring criteria	31.3% (457)	25.6% (1,033)	1.26	(0.89, 1.81)	0.195
At most 90 days of follow-up period	31.3% (457)	31.1% (1,033)	1.25	(0.91, 1.72)	0.172
Perform complete-case using the IPTW	30.9% (404)	31.9% (839)	1.24	(0.98, 1.56)	0.075
IgG antibody					
Removing hospital discharge as censoring criteria	97.1% (339)	79.4% (806)	1.26	(1.04, 1.51)	0.016
At most 90 days of follow-up period	97.1% (339)	91.7% (806)	1.22	(1.02, 1.46)	0.029
Perform complete-case using the IPTW	97.2% (288)	92.6% (651)	1.46	(1.26, 1.69)	<0.001
In-hospital death or invasive mechanical ventilation (score ≥ 7)					
Removing hospital discharge as censoring criteria	14.5% (448)	15.9% (1,059)	0.65	(0.42, 1.00)	0.050
At most 90 days of follow-up period	14.5% (448)	18.7% (1,059)	0.67	(0.46, 0.97)	0.032
Perform complete-case using the IPTW	13.5% (399)	19.4% (854)	0.69	(0.51, 0.94)	0.018
In-hospital death or invasive mechanical ventilation (score ≥ 7) or intensive care unit admission					
Removing hospital discharge as censoring criteria	11.3% (417)	15.0% (1,016)	0.61	(0.38, 1.00)	0.048
At most 90 days of follow-up period	11.3% (417)	17.3% (1,016)	0.64	(0.43, 0.97)	0.035
Perform complete-case using the IPTW	10.2% (372)	17.9% (814)	0.59	(0.41, 0.84)	0.003
In-hospital death (score = 10)					
Removing hospital discharge as censoring criteria	7.7% (466)	9.3% (1,078)	0.60	(0.34, 1.06)	0.078
At most 90 days of follow-up period	7.7% (466)	11.5% (1,078)	0.59	(0.36, 0.98)	0.042

Perform complete-case using the IPTW	7.7% (413)	11.8% (872)	0.66	(0.45, 0.97)	0.033
ARDS					
Removing hospital discharge as censoring criteria	10.7% (441)	6.7% (1,040)	1.04	(0.60, 1.79)	0.892
At most 90 days of follow-up period	10.7% (441)	8.2% (1,040)	0.99	(0.59, 1.66)	0.965
Perform complete-case using the IPTW	9.6% (397)	8.8% (841)	1.38	(0.89, 2.13)	0.153

Notes:

ARDS = acute respiratory distress syndrome; CI = confidence interval; Ct = cycle threshold; HR = hazard ratio; IgG = immunoglobulin G; IPTW = inverse probability of treatment weighting; PCR = polymerase chain reaction

† HR >1 (or <1) indicates remdesivir-dexamethasone was associated with better (worse) clinical improvement, early (late) hospital discharge or recovery; higher (lower) risk of in-hospital death, composite outcomes, or ARDS compared to the dexamethasone group

Supplementary Table 6. Subgroup analyses on the study outcomes

	Before weighting		After weighting		
	Remdesivir-Dexamethasone	Dexamethasone	Remdesivir-Dexamethasone vs Dexamethasone		
	% (N)	% (N)	HR†	95% CI	P-value
Clinical improvement on WHO clinical progression scale by ≥ 1 score					
Overall	92.1% (466)	88.1% (1,078)	1.23	(1.02, 1.49)	0.032
Age ≤ 65	97.3% (226)	97.4% (577)	1.20	(0.95, 1.52)	0.124
Age > 65	87.1% (240)	77.4% (501)	1.35	(1.00, 1.81)	0.052
Male	92.4% (264)	87.1% (628)	1.08	(0.88, 1.32)	0.445
Female	91.6% (202)	89.6% (450)	1.36	(1.01, 1.81)	0.042
Timing of dexamethasone initiation - within the first 3 days of admission	89.9% (227)	87.3% (490)	1.08	(0.81, 1.44)	0.580
Timing of dexamethasone initiation - within the first 5 days of admission	91.6% (310)	88.7% (700)	1.22	(0.95, 1.55)	0.114
Timing of dexamethasone initiation - within the first 7 days of admission	92.5% (387)	88.8% (875)	1.24	(1.01, 1.53)	0.038
Excluding patients without use of remdesivir	92.1% (466)	82.6% (149)	1.76	(1.38, 2.25)	<0.001
Excluding patients initiating remdesivir later than dexamethasone initiation	92.1% (466)	89.0% (929)	1.11	(0.92, 1.35)	0.257
Without concomitant use of other systemic steroids	92.1% (454)	89.3% (1,033)	1.23	(1.01, 1.49)	0.035
With concomitant use of other systemic steroids	91.7% (12)	62.2% (45)	1.06	(0.56, 2.02)	0.856
Administration route of dexamethasone - Oral	95.3% (64)	92.2% (283)	1.31	(0.85, 2.03)	0.217
Administration route of dexamethasone - Intravenous injection	91.5% (402)	86.7% (795)	1.25	(1.02, 1.53)	0.028
Dosage of dexamethasone - Up to 6mg daily	91.9% (185)	89.0% (518)	1.18	(0.88, 1.57)	0.267
Dosage of dexamethasone - More than 6mg daily	92.2% (281)	87.3% (560)	1.28	(1.01, 1.61)	0.042
Drug initiation sequence - Remdesivir followed by dexamethasone	93.5% (93)	88.1% (1,078)	1.64	(1.19, 2.28)	0.003
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	91.7% (373)	88.1% (1,078)	1.15	(0.93, 1.43)	0.189
Without invasive mechanical ventilation or ECMO	91.7% (448)	88.0% (1,056)	1.23	(1.01, 1.49)	0.040
With invasive mechanical ventilation or ECMO	100.0% (18)	95.5% (22)	0.84	(0.40, 1.77)	0.636
Without ICU admission	95.3% (338)	90.7% (842)	1.33	(1.06, 1.66)	0.014
With ICU admission	83.6% (128)	78.8% (236)	1.20	(0.88, 1.62)	0.246
Hospital discharge (score ≤ 3)					
Overall	90.6% (466)	87.1% (1,078)	1.18	(0.97, 1.43)	0.090
Age ≤ 65	96.9% (226)	97.2% (577)	1.10	(0.86, 1.40)	0.438
Age > 65	84.6% (240)	75.4% (501)	1.34	(0.99, 1.83)	0.061
Male	90.5% (264)	86.0% (628)	1.04	(0.84, 1.27)	0.737
Female	90.6% (202)	88.7% (450)	1.30	(0.97, 1.76)	0.083
Timing of dexamethasone initiation - within the first 3 days of admission	87.2% (227)	85.7% (490)	0.97	(0.72, 1.31)	0.860
Timing of dexamethasone initiation - within the first 5 days of admission	89.4% (310)	87.4% (700)	1.13	(0.88, 1.45)	0.343
Timing of dexamethasone initiation - within the first 7 days of admission	90.7% (387)	87.8% (875)	1.17	(0.95, 1.44)	0.147
Excluding patients without use of remdesivir	90.6% (466)	80.5% (149)	1.73	(1.36, 2.20)	<0.001
Excluding patients initiating remdesivir later than dexamethasone initiation	90.6% (466)	88.2% (929)	1.07	(0.88, 1.29)	0.514
Without concomitant use of other systemic steroids	90.7% (454)	88.3% (1,033)	1.19	(0.97, 1.44)	0.089
With concomitant use of other systemic steroids	83.3% (12)	60.0% (45)	0.88	(0.46, 1.68)	0.698

Administration route of dexamethasone - Oral	95.3% (64)	91.9% (283)	1.34	(0.86, 2.07)	0.190
Administration route of dexamethasone - Intravenous injection	89.8% (402)	85.4% (795)	1.20	(0.98, 1.47)	0.085
Dosage of dexamethasone - Up to 6mg daily	91.9% (185)	87.8% (518)	1.22	(0.91, 1.64)	0.176
Dosage of dexamethasone - More than 6mg daily	89.7% (281)	86.4% (560)	1.15	(0.91, 1.47)	0.247
Drug initiation sequence - Remdesivir followed by dexamethasone	93.5% (93)	87.1% (1,078)	1.74	(1.25, 2.44)	0.001
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	89.8% (373)	87.1% (1,078)	1.09	(0.87, 1.35)	0.457
Without invasive mechanical ventilation or ECMO	91.3% (448)	87.5% (1,056)	1.24	(1.02, 1.51)	0.031
With invasive mechanical ventilation or ECMO	72.2% (18)	68.2% (22)	0.67	(0.29, 1.57)	0.350
Without ICU admission	95.3% (338)	90.1% (842)	1.37	(1.09, 1.72)	0.007
With ICU admission	78.1% (128)	76.3% (236)	1.02	(0.75, 1.39)	0.882
Recovery (score ≤ 4)					
Overall	79.2% (154)	74.5% (341)	0.94	(0.72, 1.23)	0.663
Age ≤ 65	91.4% (58)	91.4% (140)	0.77	(0.51, 1.16)	0.212
Age > 65	71.9% (96)	62.7% (201)	1.13	(0.79, 1.61)	0.499
Male	80.0% (95)	72.2% (230)	1.05	(0.75, 1.45)	0.786
Female	78.0% (59)	79.3% (111)	0.74	(0.48, 1.12)	0.152
Timing of dexamethasone initiation - within the first 3 days of admission	80.2% (96)	74.4% (207)	0.85	(0.61, 1.19)	0.337
Timing of dexamethasone initiation - within the first 5 days of admission	79.8% (114)	75.6% (258)	0.88	(0.65, 1.18)	0.384
Timing of dexamethasone initiation - within the first 7 days of admission	80.7% (135)	75.8% (297)	0.92	(0.70, 1.22)	0.564
Excluding patients without use of remdesivir	79.2% (154)	71.9% (89)	1.11	(0.74, 1.66)	0.624
Excluding patients initiating remdesivir later than dexamethasone initiation	79.2% (154)	75.4% (252)	0.86	(0.65, 1.14)	0.295
Without concomitant use of other systemic steroids	78.5% (144)	77.0% (317)	0.91	(0.69, 1.21)	0.518
With concomitant use of other systemic steroids	90.0% (10)	41.7% (24)	1.66	(0.62, 4.46)	0.304
Administration route of dexamethasone - Oral	94.1% (17)	81.8% (66)	0.89	(0.51, 1.57)	0.693
Administration route of dexamethasone - Intravenous injection	77.4% (137)	72.7% (275)	0.98	(0.73, 1.31)	0.889
Dosage of dexamethasone - Up to 6mg daily	83.3% (42)	78.3% (152)	1.00	(0.64, 1.58)	0.989
Dosage of dexamethasone - More than 6mg daily	77.7% (112)	71.4% (189)	0.92	(0.65, 1.31)	0.647
Drug initiation sequence - Remdesivir followed by dexamethasone	78.3% (23)	74.5% (341)	1.74	(1.12, 2.70)	0.014
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	79.4% (131)	74.5% (341)	0.86	(0.65, 1.13)	0.272
Without invasive mechanical ventilation or ECMO	80.1% (136)	75.0% (320)	1.00	(0.76, 1.33)	0.989
With invasive mechanical ventilation or ECMO	72.2% (18)	66.7% (21)	0.70	(0.30, 1.63)	0.394
Without ICU admission	81.5% (27)	69.4% (108)	1.17	(0.69, 1.96)	0.560
With ICU admission	78.7% (127)	76.8% (233)	1.05	(0.77, 1.43)	0.759
Viral clearance (first negative PCR result)					
Overall	32.7% (456)	31.6% (1,043)	1.29	(0.93, 1.79)	0.126
Age ≤ 65	32.4% (222)	31.8% (560)	1.20	(0.79, 1.81)	0.396
Age > 65	32.9% (234)	31.5% (483)	1.42	(0.88, 2.31)	0.153
Male	33.7% (258)	32.1% (610)	1.15	(0.81, 1.64)	0.423
Female	31.3% (198)	30.9% (433)	1.39	(0.83, 2.32)	0.211
Timing of dexamethasone initiation - within the first 3 days of admission	39.0% (223)	35.1% (485)	1.11	(0.75, 1.63)	0.610
Timing of dexamethasone initiation - within the first 5 days of admission	35.9% (306)	34.7% (686)	1.35	(0.88, 2.06)	0.169

Timing of dexamethasone initiation - within the first 7 days of admission	34.7% (383)	33.5% (857)	1.38	(0.96, 1.96)	0.078
Excluding patients without use of remdesivir	32.7% (456)	40.5% (148)	1.27	(0.84, 1.91)	0.255
Excluding patients initiating remdesivir later than dexamethasone initiation	32.7% (456)	30.2% (895)	1.30	(0.93, 1.81)	0.120
Without concomitant use of other systemic steroids	33.1% (444)	31.7% (1,000)	1.33	(0.96, 1.85)	0.086
With concomitant use of other systemic steroids	16.7% (12)	30.2% (43)	0.25	(0.06, 1.06)	0.060
Administration route of dexamethasone - Oral	28.1% (64)	30.1% (279)	0.91	(0.38, 2.19)	0.838
Administration route of dexamethasone - Intravenous injection	33.4% (392)	32.2% (764)	1.40	(0.99, 1.97)	0.058
Dosage of dexamethasone - Up to 6mg daily	33.9% (180)	29.6% (503)	1.47	(0.86, 2.50)	0.159
Dosage of dexamethasone - More than 6mg daily	31.9% (276)	33.5% (540)	1.14	(0.80, 1.63)	0.462
Drug initiation sequence - Remdesivir followed by dexamethasone	23.6% (89)	31.6% (1,043)	1.03	(0.51, 2.06)	0.943
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	34.9% (367)	31.6% (1,043)	1.35	(0.95, 1.93)	0.097
Without invasive mechanical ventilation or ECMO	31.7% (439)	31.0% (1,021)	1.32	(0.94, 1.85)	0.112
With invasive mechanical ventilation or ECMO	58.8% (17)	59.1% (22)	0.69	(0.25, 1.91)	0.464
Without ICU admission	27.7% (329)	26.3% (813)	1.65	(1.09, 2.49)	0.018
With ICU admission	45.7% (127)	50.4% (230)	0.77	(0.48, 1.22)	0.261
Low viral load (Ct value \geq 35)					
Overall	31.3% (457)	31.2% (1,033)	1.25	(0.91, 1.72)	0.177
Age \leq 65	29.9% (221)	31.2% (552)	1.18	(0.72, 1.92)	0.510
Age > 65	32.6% (236)	31.2% (481)	1.35	(0.91, 2.02)	0.140
Male	33.6% (262)	32.1% (605)	1.24	(0.88, 1.75)	0.216
Female	28.2% (195)	29.9% (428)	1.25	(0.72, 2.16)	0.422
Timing of dexamethasone initiation - within the first 3 days of admission	40.3% (226)	35.2% (480)	1.39	(0.89, 2.17)	0.151
Timing of dexamethasone initiation - within the first 5 days of admission	35.2% (307)	34.8% (683)	1.25	(0.84, 1.85)	0.275
Timing of dexamethasone initiation - within the first 7 days of admission	34.3% (382)	33.7% (846)	1.32	(0.94, 1.86)	0.103
Excluding patients without use of remdesivir	31.3% (457)	39.5% (147)	1.17	(0.79, 1.73)	0.435
Excluding patients initiating remdesivir later than dexamethasone initiation	31.3% (457)	29.8% (886)	1.28	(0.92, 1.77)	0.140
Without concomitant use of other systemic steroids	31.5% (445)	31.1% (990)	1.27	(0.92, 1.76)	0.146
With concomitant use of other systemic steroids	25.0% (12)	32.6% (43)	0.55	(0.15, 2.00)	0.353
Administration route of dexamethasone - Oral	27.0% (63)	28.4% (268)	0.94	(0.41, 2.15)	0.886
Administration route of dexamethasone - Intravenous injection	32.0% (394)	32.2% (765)	1.28	(0.91, 1.81)	0.152
Dosage of dexamethasone - Up to 6mg daily	30.9% (181)	30.8% (493)	1.25	(0.72, 2.19)	0.425
Dosage of dexamethasone - More than 6mg daily	31.5% (276)	31.5% (540)	1.23	(0.87, 1.74)	0.242
Drug initiation sequence - Remdesivir followed by dexamethasone	32.2% (90)	31.2% (1,033)	2.00	(0.94, 4.28)	0.073
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	31.1% (367)	31.2% (1,033)	1.09	(0.80, 1.48)	0.587
Without invasive mechanical ventilation or ECMO	30.1% (439)	30.9% (1,012)	1.21	(0.86, 1.70)	0.281
With invasive mechanical ventilation or ECMO	61.1% (18)	42.9% (21)	1.40	(0.59, 3.35)	0.433
Without ICU admission	23.7% (329)	27.7% (802)	1.21	(0.77, 1.91)	0.398
With ICU admission	50.8% (128)	43.3% (231)	1.18	(0.78, 1.78)	0.443
IgG antibody					
Overall	97.1% (339)	91.7% (806)	1.22	(1.02, 1.46)	0.029
Age \leq 65	98.7% (149)	96.2% (418)	1.11	(0.83, 1.49)	0.492

Age > 65	95.8% (190)	86.9% (388)	1.34	(1.07, 1.67)	0.012
Male	97.9% (193)	93.1% (466)	1.02	(0.83, 1.25)	0.859
Female	95.9% (146)	89.7% (340)	1.47	(1.14, 1.91)	0.003
Timing of dexamethasone initiation - within the first 3 days of admission	95.7% (188)	90.5% (431)	1.20	(0.91, 1.59)	0.187
Timing of dexamethasone initiation - within the first 5 days of admission	96.5% (254)	91.5% (588)	1.23	(0.98, 1.54)	0.071
Timing of dexamethasone initiation - within the first 7 days of admission	97.0% (299)	91.5% (707)	1.25	(1.02, 1.52)	0.032
Excluding patients without use of remdesivir	97.1% (339)	96.0% (125)	1.60	(1.26, 2.03)	<0.001
Excluding patients initiating remdesivir later than dexamethasone initiation	97.1% (339)	90.9% (681)	1.13	(0.94, 1.35)	0.206
Without concomitant use of other systemic steroids	97.0% (329)	92.1% (769)	1.23	(1.02, 1.48)	0.029
With concomitant use of other systemic steroids	100.0% (10)	83.8% (37)	0.91	(0.44, 1.91)	0.806
Administration route of dexamethasone - Oral	100.0% (58)	91.5% (212)	1.13	(0.80, 1.60)	0.483
Administration route of dexamethasone - Intravenous injection	96.4% (281)	91.8% (594)	1.25	(1.01, 1.55)	0.039
Dosage of dexamethasone - Up to 6mg daily	97.9% (143)	92.0% (386)	1.49	(1.14, 1.96)	0.004
Dosage of dexamethasone - More than 6mg daily	96.4% (196)	91.4% (420)	1.05	(0.84, 1.32)	0.658
Drug initiation sequence - Remdesivir followed by dexamethasone	98.3% (58)	91.7% (806)	1.32	(0.79, 2.21)	0.288
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	96.8% (281)	91.7% (806)	1.20	(1.01, 1.44)	0.042
Without invasive mechanical ventilation or ECMO	97.2% (325)	92.1% (789)	1.23	(1.02, 1.48)	0.026
With invasive mechanical ventilation or ECMO	92.9% (14)	70.6% (17)	2.06	(0.69, 6.15)	0.188
Without ICU admission	97.4% (228)	91.6% (608)	1.30	(1.03, 1.63)	0.027
With ICU admission	96.4% (111)	91.9% (198)	1.20	(0.92, 1.57)	0.182

In-hospital death or invasive mechanical ventilation (score ≥ 7)

Overall	14.5% (448)	18.8% (1,059)	0.67	(0.46, 0.96)	0.031
Age ≤ 65	7.3% (220)	7.2% (570)	0.86	(0.42, 1.75)	0.669
Age > 65	21.5% (228)	32.3% (489)	0.59	(0.39, 0.90)	0.014
Male	15.1% (252)	20.9% (616)	0.70	(0.42, 1.15)	0.154
Female	13.8% (196)	15.8% (443)	0.65	(0.39, 1.10)	0.108
Timing of dexamethasone initiation - within the first 3 days of admission	22.1% (213)	23.6% (479)	0.78	(0.51, 1.19)	0.249
Timing of dexamethasone initiation - within the first 5 days of admission	17.6% (295)	21.2% (685)	0.71	(0.48, 1.04)	0.080
Timing of dexamethasone initiation - within the first 7 days of admission	15.4% (370)	19.7% (859)	0.69	(0.48, 1.00)	0.050
Excluding patients without use of remdesivir	14.5% (448)	34.2% (146)	0.40	(0.24, 0.65)	<0.001
Excluding patients initiating remdesivir later than dexamethasone initiation	14.5% (448)	16.3% (913)	0.79	(0.54, 1.15)	0.219
Without concomitant use of other systemic steroids	14.2% (438)	17.7% (1,016)	0.71	(0.49, 1.04)	0.076
With concomitant use of other systemic steroids	30.0% (10)	44.2% (43)	0.14	(0.03, 0.74)	0.021
Administration route of dexamethasone - Oral	10.9% (64)	11.7% (282)	1.10	(0.39, 3.05)	0.860
Administration route of dexamethasone - Intravenous injection	15.1% (384)	21.4% (777)	0.59	(0.40, 0.86)	0.006
Dosage of dexamethasone - Up to 6mg daily	12.0% (183)	17.9% (503)	0.56	(0.33, 0.93)	0.025
Dosage of dexamethasone - More than 6mg daily	16.2% (265)	19.6% (556)	0.76	(0.46, 1.24)	0.268
Drug initiation sequence - Remdesivir followed by dexamethasone	7.7% (91)	18.8% (1,059)	0.43	(0.15, 1.23)	0.115
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	16.2% (357)	18.8% (1,059)	0.72	(0.49, 1.06)	0.095
Without invasive mechanical ventilation or ECMO	14.5% (448)	18.8% (1,056)	0.67	(0.46, 0.97)	0.032
With invasive mechanical ventilation or ECMO	NA (0)	33.3% (3)	NA	NA	NA

Without ICU admission	4.1% (338)	10.2% (842)	0.37	(0.18, 0.74)	0.005
With ICU admission	46.4% (110)	52.1% (217)	0.80	(0.51, 1.26)	0.338
In-hospital death or invasive mechanical ventilation (score ≥ 7) or intensive care unit admission					
Overall	11.3% (417)	17.4% (1,016)	0.64	(0.43, 0.97)	0.034
Age ≤ 65	5.7% (209)	5.9% (546)	0.98	(0.45, 2.14)	0.956
Age > 65	16.8% (208)	30.9% (470)	0.54	(0.33, 0.87)	0.011
Male	10.8% (232)	19.6% (588)	0.63	(0.35, 1.13)	0.125
Female	11.9% (185)	14.5% (428)	0.69	(0.39, 1.19)	0.180
Timing of dexamethasone initiation - within the first 3 days of admission	15.1% (185)	20.5% (438)	0.74	(0.46, 1.22)	0.237
Timing of dexamethasone initiation - within the first 5 days of admission	12.5% (265)	19.0% (642)	0.66	(0.42, 1.03)	0.064
Timing of dexamethasone initiation - within the first 7 days of admission	11.2% (339)	17.9% (816)	0.65	(0.43, 0.99)	0.043
Excluding patients without use of remdesivir	11.3% (417)	36.3% (124)	0.35	(0.20, 0.61)	<0.001
Excluding patients initiating remdesivir later than dexamethasone initiation	11.3% (417)	14.8% (892)	0.76	(0.50, 1.16)	0.205
Without concomitant use of other systemic steroids	11.2% (409)	16.3% (974)	0.70	(0.46, 1.06)	0.091
With concomitant use of other systemic steroids	12.5% (8)	42.9% (42)	0.09	(0.01, 0.85)	0.036
Administration route of dexamethasone - Oral	10.0% (60)	11.3% (275)	1.09	(0.38, 3.15)	0.876
Administration route of dexamethasone - Intravenous injection	11.5% (357)	19.7% (741)	0.56	(0.36, 0.85)	0.007
Dosage of dexamethasone - Up to 6mg daily	9.7% (176)	16.3% (484)	0.53	(0.30, 0.94)	0.029
Dosage of dexamethasone - More than 6mg daily	12.4% (241)	18.4% (532)	0.73	(0.42, 1.27)	0.262
Drug initiation sequence - Remdesivir followed by dexamethasone	7.8% (90)	17.4% (1,016)	0.47	(0.16, 1.35)	0.159
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	12.2% (327)	17.4% (1,016)	0.68	(0.44, 1.05)	0.082
Without invasive mechanical ventilation or ECMO	11.3% (417)	17.4% (1,013)	0.64	(0.43, 0.97)	0.035
With invasive mechanical ventilation or ECMO	NA (0)	33.3% (3)	NA	NA	NA
Without ICU admission	4.4% (338)	10.8% (842)	0.35	(0.18, 0.69)	0.003
With ICU admission	40.5% (79)	49.4% (174)	0.88	(0.51, 1.53)	0.658
In-hospital death (score = 10)					
Overall	7.7% (466)	11.6% (1,078)	0.59	(0.36, 0.98)	0.042
Age ≤ 65	1.8% (226)	2.1% (577)	0.82	(0.17, 4.02)	0.807
Age > 65	13.3% (240)	22.6% (501)	0.56	(0.33, 0.94)	0.029
Male	7.6% (264)	12.3% (628)	0.55	(0.28, 1.07)	0.079
Female	7.9% (202)	10.7% (450)	0.63	(0.30, 1.29)	0.204
Timing of dexamethasone initiation - within the first 3 days of admission	10.1% (227)	13.1% (490)	0.53	(0.29, 0.95)	0.033
Timing of dexamethasone initiation - within the first 5 days of admission	8.4% (310)	11.1% (700)	0.56	(0.32, 0.98)	0.042
Timing of dexamethasone initiation - within the first 7 days of admission	7.5% (387)	10.9% (875)	0.56	(0.33, 0.95)	0.033
Excluding patients without use of remdesivir	7.7% (466)	16.8% (149)	0.59	(0.30, 1.19)	0.143
Excluding patients initiating remdesivir later than dexamethasone initiation	7.7% (466)	10.8% (929)	0.60	(0.36, 1.00)	0.050
Without concomitant use of other systemic steroids	7.5% (454)	10.6% (1,033)	0.63	(0.37, 1.07)	0.087
With concomitant use of other systemic steroids	16.7% (12)	35.6% (45)	0.28	(0.06, 1.43)	0.124
Administration route of dexamethasone - Oral	4.7% (64)	7.4% (283)	1.15	(0.33, 3.99)	0.830
Administration route of dexamethasone - Intravenous injection	8.2% (402)	13.1% (795)	0.51	(0.30, 0.86)	0.011
Dosage of dexamethasone - Up to 6mg daily	5.9% (185)	11.4% (518)	0.52	(0.26, 1.06)	0.072

Dosage of dexamethasone - More than 6mg daily	8.9% (281)	11.8% (560)	0.64	(0.33, 1.25)	0.189
Drug initiation sequence - Remdesivir followed by dexamethasone	6.5% (93)	11.6% (1,078)	0.83	(0.27, 2.51)	0.740
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	8.0% (373)	11.6% (1,078)	0.54	(0.31, 0.93)	0.026
Without invasive mechanical ventilation or ECMO	7.1% (448)	11.2% (1,056)	0.61	(0.36, 1.05)	0.074
With invasive mechanical ventilation or ECMO	22.2% (18)	31.8% (22)	0.35	(0.08, 1.52)	0.155
Without ICU admission	3.8% (338)	9.1% (842)	0.41	(0.20, 0.85)	0.017
With ICU admission	18.0% (128)	20.3% (236)	0.76	(0.38, 1.51)	0.430

ARDS

Overall	10.7% (441)	8.2% (1,040)	0.99	(0.59, 1.66)	0.965
Age ≤ 65	9.1% (219)	7.5% (561)	0.92	(0.44, 1.92)	0.823
Age > 65	12.2% (222)	9.0% (479)	1.04	(0.51, 2.14)	0.910
Male	10.5% (247)	8.7% (598)	1.00	(0.49, 2.04)	0.999
Female	10.8% (194)	7.5% (442)	0.98	(0.47, 2.05)	0.949
Timing of dexamethasone initiation - within the first 3 days of admission	14.9% (208)	12.3% (471)	0.98	(0.54, 1.80)	0.953
Timing of dexamethasone initiation - within the first 5 days of admission	12.8% (289)	11.3% (675)	0.88	(0.51, 1.51)	0.637
Timing of dexamethasone initiation - within the first 7 days of admission	12.1% (364)	9.3% (839)	0.93	(0.56, 1.54)	0.783
Excluding patients without use of remdesivir	10.7% (441)	22.1% (140)	0.43	(0.23, 0.80)	0.008
Excluding patients initiating remdesivir later than dexamethasone initiation	10.7% (441)	6.0% (900)	1.40	(0.81, 2.42)	0.223
Without concomitant use of other systemic steroids	10.4% (432)	8.1% (997)	0.95	(0.56, 1.62)	0.857
With concomitant use of other systemic steroids	22.2% (9)	9.3% (43)	1.73	(0.38, 7.83)	0.466
Administration route of dexamethasone - Oral	16.9% (59)	9.7% (267)	1.35	(0.42, 4.39)	0.614
Administration route of dexamethasone - Intravenous injection	9.7% (382)	7.6% (773)	0.92	(0.53, 1.60)	0.775
Dosage of dexamethasone - Up to 6mg daily	10.9% (174)	9.3% (496)	0.88	(0.40, 1.95)	0.750
Dosage of dexamethasone - More than 6mg daily	10.5% (267)	7.2% (544)	1.13	(0.58, 2.19)	0.727
Drug initiation sequence - Remdesivir followed by dexamethasone	7.5% (93)	8.2% (1,040)	0.59	(0.22, 1.57)	0.294
Drug initiation sequence - Co-initiation of remdesivir and dexamethasone	11.5% (348)	8.2% (1,040)	1.10	(0.63, 1.93)	0.737
Without invasive mechanical ventilation or ECMO	9.8% (427)	8.2% (1,023)	0.82	(0.47, 1.42)	0.472
With invasive mechanical ventilation or ECMO	35.7% (14)	5.9% (17)	13.10	(1.20, 142.71)	0.036
Without ICU admission	4.5% (333)	2.5% (828)	1.63	(0.63, 4.17)	0.310
With ICU admission	29.6% (108)	30.2% (212)	0.72	(0.40, 1.29)	0.267

Notes:

ARDS = acute respiratory distress syndrome; CI = confidence interval; Ct = cycle threshold; ECMO = extracorporeal membrane oxygenation; HR = hazard ratio; ICU = intensive care unit; IgG = immunoglobulin G; PCR = polymerase chain reaction

† HR >1 (or <1) indicates remdesivir-dexamethasone was associated with better (worse) clinical improvement, early (late) hospital discharge or recovery; higher (lower) risk of in-hospital death, composite outcomes, or ARDS compared to the dexamethasone group

Supplementary Table 7. Clinical status of patients as indicated by the WHO clinical progression scale score

Day from baseline	0		7		15	
Clinical status	Remdesivir- Dexamethasone (N=466)	Dexamethasone (N=1,078)	Remdesivir- Dexamethasone (N=466)	Dexamethasone (N=1,078)	Remdesivir- Dexamethasone (N=466)	Dexamethasone (N=1,078)
Before weighting	N	N	N	N	N	N
Discharge	0	0	96	157	564	564
No oxygen therapy	312	737	178	452	138	138
Supplemental oxygen without ventilation	136	322	159	385	275	275
Mechanical ventilation	18	19	28	53	25	25
In-hospital death	0	0	5	31	76	76
After weighting	%	%	%	%	%	%
Discharge	0%	0%	26%	15%	59%	51%
No oxygen therapy	72%	67%	38%	41%	11%	13%
Supplemental oxygen without ventilation	23%	31%	29%	37%	25%	27%
Mechanical ventilation	4%	2%	6%	5%	4%	3%
In-hospital death	0%	0%	1%	3%	2%	7%
Day from baseline	30		60		90	
Clinical status	Remdesivir- Dexamethasone (N=466)	Dexamethasone (N=1,078)	Remdesivir- Dexamethasone (N=466)	Dexamethasone (N=1,078)	Remdesivir- Dexamethasone (N=466)	Dexamethasone (N=1,078)
Before weighting	N	N	N	N	N	N
Discharge	360	797	403	889	417	915
No oxygen therapy	9	47	3	13	3	7
Supplemental oxygen without ventilation	60	107	24	42	6	20
Mechanical ventilation	17	27	5	16	4	12
In-hospital death	20	100	31	118	36	124
After weighting	%	%	%	%	%	%
Discharge	81%	73%	88%	82%	91%	85%
No oxygen therapy	2%	5%	1%	1%	1%	1%
Supplemental oxygen without ventilation	10%	10%	6%	4%	1%	2%
Mechanical ventilation	4%	3%	1%	2%	1%	1%
In-hospital death	3%	10%	5%	11%	6%	11%

Supplementary Table 8. Comparison of changes in laboratory parameters from baseline to the last measurement available during hospitalization

		Baseline	Baseline (with last measurement)	Last measurement	Paired difference	P-value* for difference = 0
White blood cell, $\times 10^9/L$ (Mean \pm SD)	Remdesivir-Dexamethasone	5.5 (2.2)	5.5 (2.2)	8.7 (3.6)	3.2 (3.9)	<0.001
	Dexamethasone	5.7 (2.5)	5.7 (2.5)	8.8 (4.2)	3.1 (4.2)	<0.001
	P-value \dagger	0.046	0.051	0.373	0.707	
Neutrophil, $\times 10^9/L$ (Mean \pm SD)	Remdesivir-Dexamethasone	3.9 (2.1)	3.9 (2.1)	6.4 (3.3)	2.5 (3.7)	<0.001
	Dexamethasone	4.2 (2.4)	4.2 (2.4)	6.6 (4.0)	2.4 (4.1)	<0.001
	P-value \dagger	0.026	0.029	0.252	0.721	
Lymphocyte, $\times 10^9/L$ (Mean \pm SD)	Remdesivir-Dexamethasone	1.0 (0.5)	1.0 (0.5)	1.4 (0.9)	0.4 (0.8)	<0.001
	Dexamethasone	1.0 (0.4)	1.0 (0.4)	1.4 (0.8)	0.4 (0.7)	<0.001
	P-value \dagger	0.803	0.770	0.121	0.061	
Platelet, $\times 10^9/L$ (Mean \pm SD)	Remdesivir-Dexamethasone	176.4 (63.3)	176.4 (63.3)	311.7 (108.1)	135.3 (93.7)	<0.001
	Dexamethasone	183.9 (72.3)	183.9 (72.3)	304.3 (124.6)	120.4 (112.5)	<0.001
	P-value \dagger	0.008	0.008	0.117	<0.001	
Lactate dehydrogenase, U/L (Mean \pm SD)	Remdesivir-Dexamethasone	320.6 (127.7)	320.5 (127.6)	272.3 (107.7)	-48.1 (139.7)	<0.001
	Dexamethasone	324.2 (145.7)	323.8 (146.1)	303.1 (688.9)	-20.6 (693.1)	0.248
	P-value \dagger	0.564	0.604	0.085	0.137	
Creatine kinase, U/L (Mean \pm SD)	Remdesivir-Dexamethasone	269.0 (481.5)	260.7 (485.5)	75.6 (91.7)	-185.1 (469.2)	<0.001
	Dexamethasone	258.8 (508.7)	270.2 (523.7)	226.4 (2,363.8)	-43.8 (2,419.7)	0.535
	P-value \dagger	0.756	0.669	0.030	0.054	
Total bilirubin, $\mu\text{mol/L}$ (Mean \pm SD)	Remdesivir-Dexamethasone	9.3 (6.0)	9.3 (6.0)	10.4 (8.6)	1.1 (8.1)	<0.001
	Dexamethasone	9.9 (6.8)	9.9 (6.8)	10.5 (18.2)	0.6 (17.7)	0.175
	P-value \dagger	0.072	0.068	0.913	0.350	

C-reactive protein, mg/L (Mean±SD)	Remdesivir-Dexamethasone	56.8 (48.7)	56.6 (48.7)	17.1 (38.0)	-39.5 (56.9)	<0.001
	Dexamethasone	60.1 (57.8)	59.5 (56.4)	19.7 (40.5)	-39.7 (61.5)	<0.001
	P-value†	0.161	0.230	0.095	0.934	
Cycle threshold value, cycle (Mean±SD)	Remdesivir-Dexamethasone	24.9 (6.0)	24.8 (6.0)	31.0 (7.4)	6.2 (8.7)	<0.001
	Dexamethasone	24.1 (5.6)	24.0 (5.6)	30.8 (7.0)	6.8 (8.6)	<0.001
	P-value†	0.007	0.007	0.389	0.158	
eGFR, mL/min/1.73m ² (Mean±SD)	Remdesivir-Dexamethasone	104.9 (44.8)	104.9 (44.8)	117.8 (62.5)	12.9 (70.2)	<0.001
	Dexamethasone	106.7 (80.3)	106.7 (80.3)	157.5 (837.7)	50.7 (839.6)	0.041
	P-value†	0.588	0.582	0.110	0.129	
ALP, U/L (Mean±SD)	Remdesivir-Dexamethasone	67.9 (33.8)	67.9 (33.4)	73.3 (27.7)	5.3 (28.5)	<0.001
	Dexamethasone	72.3 (49.4)	72.2 (49.4)	81.0 (53.4)	8.8 (53.0)	<0.001
	P-value†	0.019	0.013	<0.001	0.048	
ALT, U/L (Mean±SD)	Remdesivir-Dexamethasone	36.0 (24.4)	36.0 (24.4)	48.5 (44.9)	12.5 (43.4)	<0.001
	Dexamethasone	38.4 (39.2)	38.4 (39.2)	74.1 (268.2)	35.7 (267.9)	<0.001
	P-value†	0.062	0.064	<0.001	0.002	
Hemoglobin, g/dL (Mean±SD)	Remdesivir-Dexamethasone	13.3 (1.4)	13.3 (1.4)	12.7 (1.9)	-0.6 (1.6)	<0.001
	Dexamethasone	13.2 (1.8)	13.2 (1.8)	12.4 (2.0)	-0.9 (1.7)	<0.001
	P-value†	0.462	0.462	<0.001	<0.001	

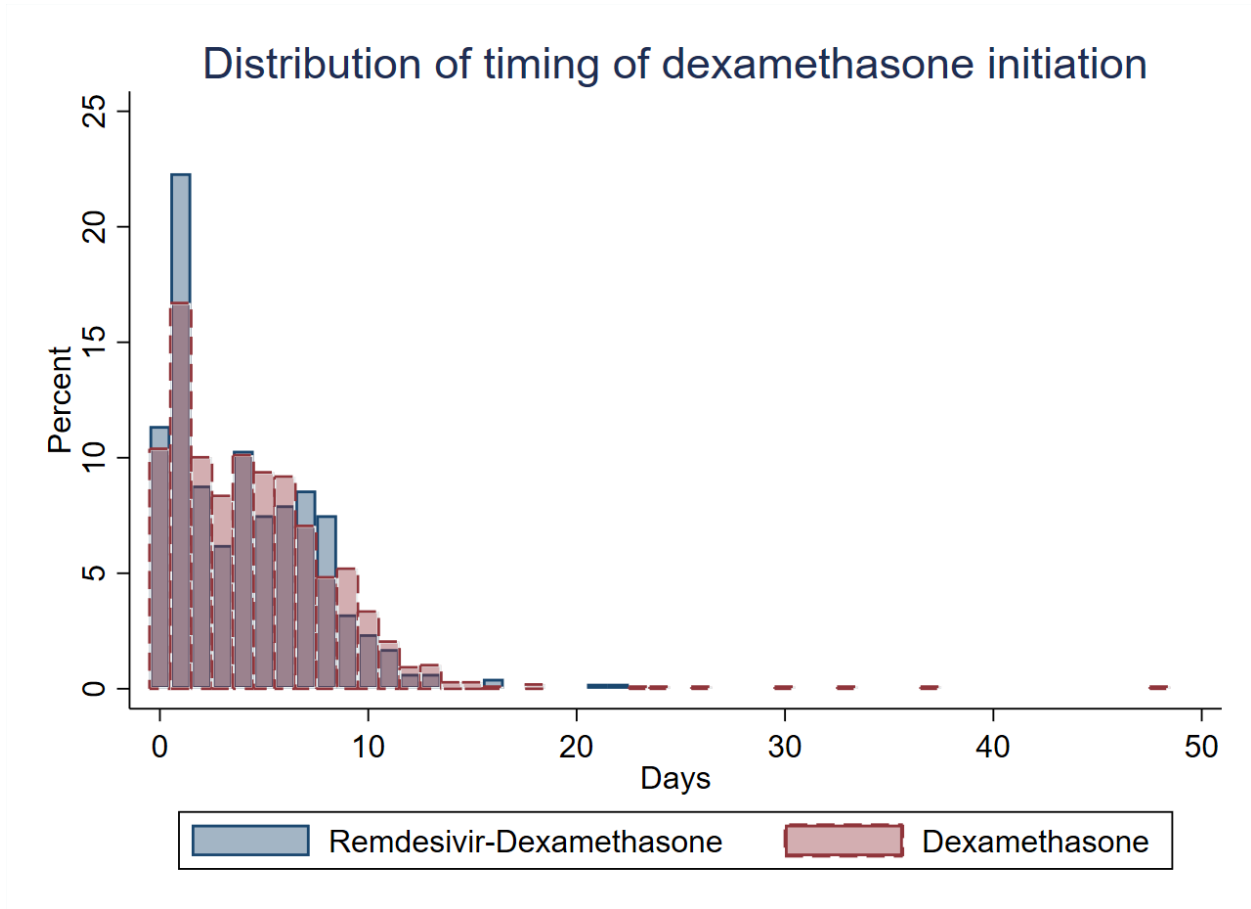
Notes:

ALP = alkaline phosphatase; ALT = alanine transaminase; eGFR = estimated glomerular filtration rate; SD = standard deviation

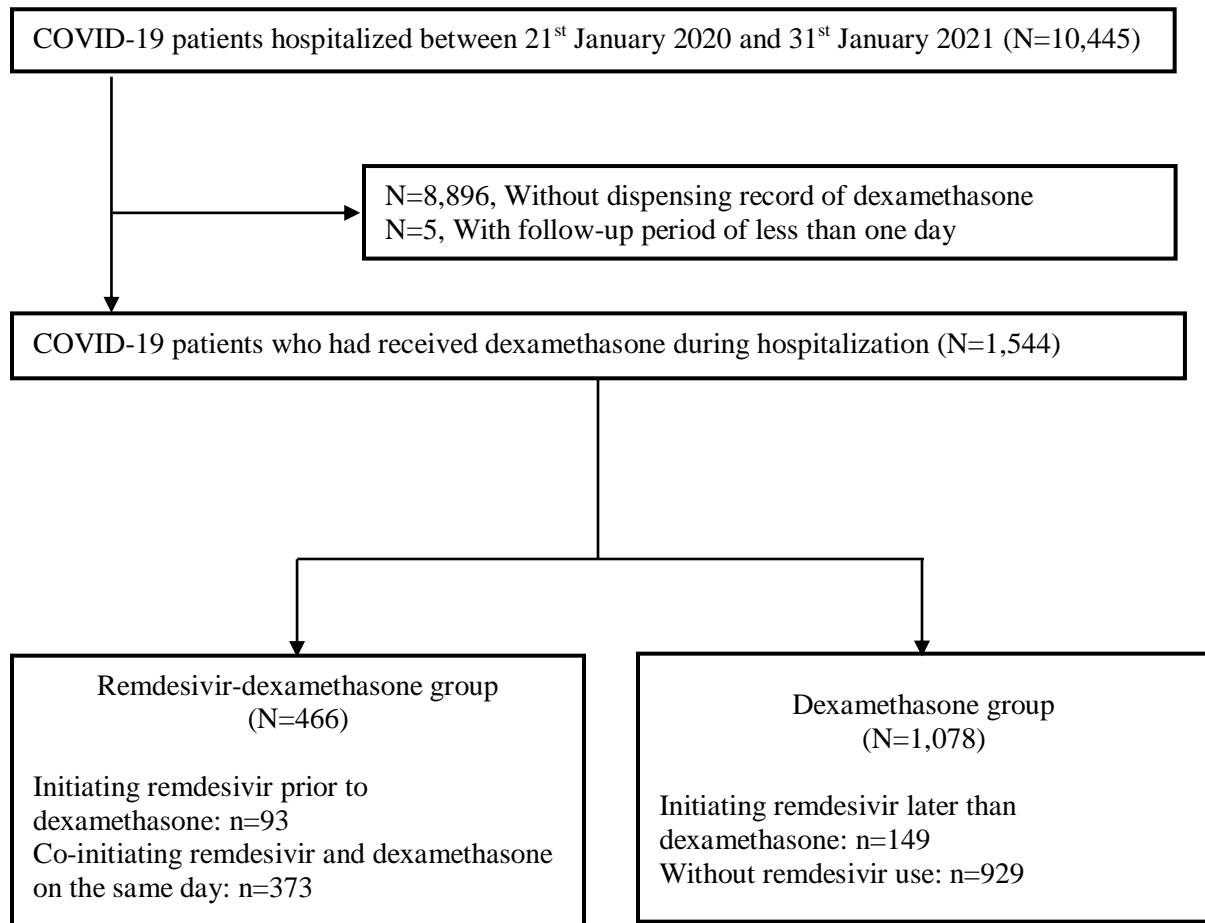
† P-value is calculated by linear regression between remdesivir-dexamethasone and dexamethasone groups

* P-value is calculated by paired t-test within remdesivir-dexamethasone and dexamethasone groups

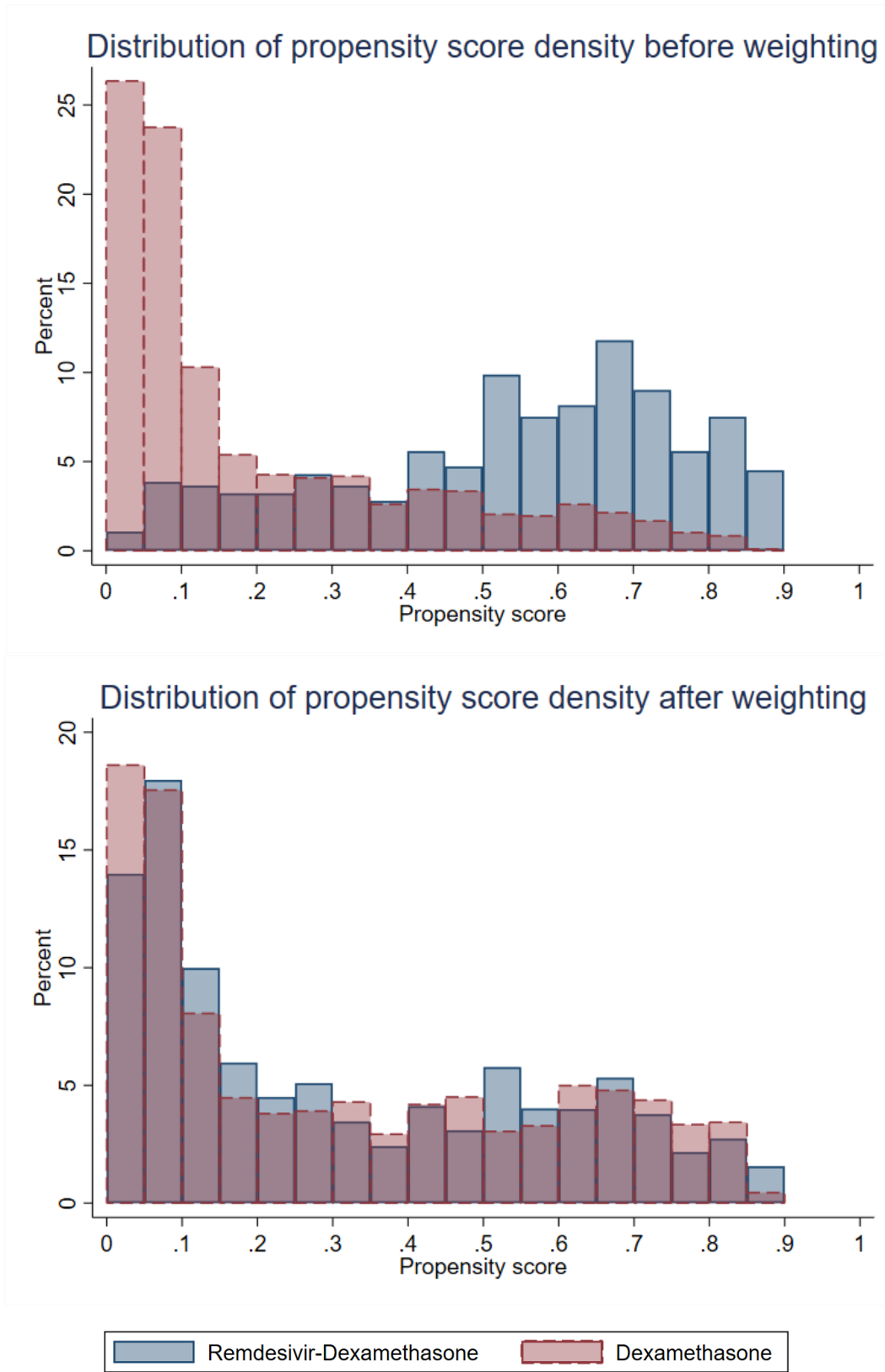
Supplementary Figure 1. Distribution of timing of dexamethasone initiation by the two treatment groups



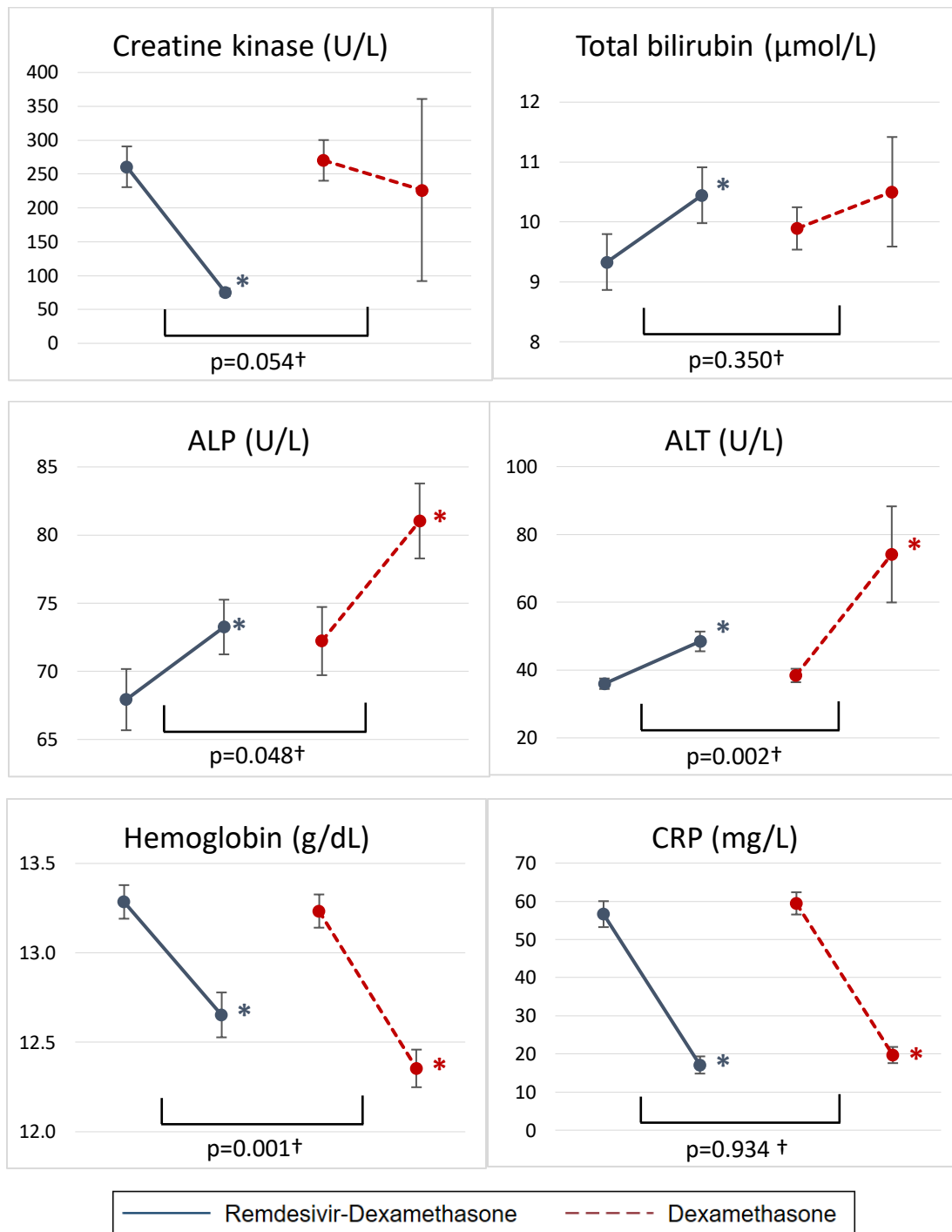
Supplementary Figure 2. Flowchart of including eligible COVID-19 patients who were treated with dexamethasone during hospitalization



Supplementary Figure 3. Distribution of propensity score density by the two treatment groups before and after weighting



Supplementary Figure 4. Comparison of changes in creatine kinase, total bilirubin, alkaline phosphatase (ALP), alanine transaminase (ALT), hemoglobin, and c-reactive protein (CRP) from baseline to the last measurement available during hospitalization between remdesivir-dexamethasone and dexamethasone groups



Notes: ALP = alkaline phosphatase; ALT = alanine transaminase; CRP = c-reactive protein

* Significant difference (p < 0.05) in mean of change from baseline to the last measurement available during hospitalization within remdesivir-dexamethasone and dexamethasone groups by paired t-test

† P-values indicate differences in change from baseline to the last measurement available during hospitalization between remdesivir-dexamethasone and dexamethasone groups by linear regression