

Supplemental Material

Table S1. Variables included in the propensity score model

Abdominal pain 30 days prior to index date
Age at index date
Angiotensin receptor blockers inhibitors use 90 days prior to index date
Angiotensin receptor blockers inhibitors use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Angiotensin-converting-enzyme's inhibitors use 90 days prior to index date
Angiotensin-converting-enzyme's inhibitors use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Angiotensin-converting-enzyme's inhibitors use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Antibiotics use 90 days prior to index date
Antibiotics use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Antibiotics use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Anticoagulant/antiplatelets use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Anticoagulant/antiplatelets use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Antiparasitic use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Antivirals use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Baseline supplemental oxygen
Body mass index
Charlson comorbidity index
Chills 30 days prior to index date
Corticosteroids use 90 days prior to index date
Cough (new onset) 30 days prior to index date
Current intensive care admission
Diarrhea 30 days prior to index date
Elixhauser score
Ethnicity
Facility indicator
Fever (>100.4F) 30 days prior to index date
Fungal infection 90 days prior to index date
Gender
H2 blocker use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Headache 30 days prior to index date
History of acute kidney injury 2 years prior to index date
History of acute liver injury 2 years prior to index date
History of alcohol dependence 2 years prior to index date
History of any diabetes 2 years prior to index date
History of arrhythmia 2 years prior to index date
History of Bell's palsy 2 years prior to index date
History of bipolar disorder 2 years prior to index date
History of bronchitis 2 years prior to index date
History of cancer 2 years prior to index date
History of cardiomyopathy 2 years prior to index date
History of Cheyne stokes breathing pattern 2 years prior to index date
History of chronic kidney disease 2 years prior to index date
History of chronic kidney failure 2 years prior to index date
History of chronic lung disease 2 years prior to index date
History of chronic rheumatic heart disease 2 years prior to index date
History of cirrhosis 2 years prior to index date

History of congestive heart failure 2 years prior to index date
History of coronary atherosclerosis and other heart disease 2 years prior to index date
History of dementia 2 years prior to index date
History of emphysema 2 years prior to index date
History of hyperlipidemia 2 years prior to index date
History of hypertension 2 years prior to index date
History of major depressive disorder 2 years prior to index date
History of mild liver disease 2 years prior to index date
History of nephrosis 2 years prior to index date
History of non-alcohol drug dependency 2 years prior to index date
History of obesity hypoventilation 2 years prior to index date
History of obstructive sleep apnea 2 years prior to index date
History of other heart disease/ill-defined heart disease 2 years prior to index date
History of pneumonia 2 years prior to index date
History of pulmonary fibrosis 2 years prior to index date
History of schizophrenia 2 years prior to index date
History of septic shock 2 years prior to index date
History of sickle cell disease 2 years prior to index date
History of sleep apnea 2 years prior to index date
History of sleep related non-obstructive hypoventilation 2 years prior to index date
History of thalassemia 2 years prior to index date
History of urinary stones/kidney stones 2 years prior to index date
History of ventilator-associated pneumonia 2 years prior to index date
Immunosuppressants use 90 days prior to index date
Immunosuppressants use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Interleukin-6 inhibitors use 90 days prior to index date
Interleukin-6 inhibitors use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Interleukin-6 inhibitors use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Janus kinase inhibitors use 90 days prior to index date
Janus kinase inhibitors use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Janus kinase inhibitors use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Loss of smell 30 days prior to index date
Malaise (fatigue) 30 days prior to index date
Marital status
Monoclonal antibodies (bamlanivimab/etesevimab, casirivimab/imdevimab) use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Monoclonal antibodies (bamlanivimab/etesevimab, casirivimab/imdevimab) use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Month and year of index date
Muscle aches (myalgia) 30 days prior to index date
Non-steroidal anti-inflammatory drugs use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Non-steroidal anti-inflammatory drugs use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Race
Rurality
Smoking status
Source of admission
Statin use during admission concomitant with remdesivir in the remdesivir group or concomitant with corticosteroids in the corticosteroid group
Statin use during admission prior to remdesivir initiation in the remdesivir group or prior to corticosteroids initiation in the corticosteroid group
Treating specialty
Vaccination status

Table S2. Sensitivity analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens

	No. of events / No. of patients (%)		Adjusted hazards ratio and 95% confidence interval, model 1 ^a	Adjusted hazards ratio and 95% confidence interval, model 2 ^b	Variable controlled for in model 2
Time-to-event outcomes	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	1,838/14,509 (12.7%)	620/4,365 (14.2%)	0.87 (0.78-0.97)	0.86 (0.77-0.95)	Cefepime, enoxaparin, heparin, hydrocortisone, prednisone, vancomycin
PS matched	440/3,325 (13.2%)	465/3,325 (14%)	0.70 (0.53-0.93)	0.66 (0.51-0.86)	Heparin, prednisone
IPTW	1,838/14,509 (12.7%)	620/4,365 (14.2%)	0.85 (0.78-0.92)	0.85 (0.78-0.92)	Cefepime, enoxaparin, heparin, hydrocortisone, methylprednisolone, prednisone, vancomycin
30-day mortality					
PS quintile adjusted	485/12,671 (3.8%)	240/3,745 (6.4%)	0.82 (0.69-0.98)	0.81 (0.69-0.96)	Cefepime, dexamethasone, enoxaparin, meropenem, piperacillin/tazobactam
PS matched	125/2,885 (4.3%)	166/2,860 (5.8%)	0.72 (0.54-0.96)	0.71 (0.55-0.93)	Enoxaparin, vancomycin
IPTW	485/12,671 (3.8%)	240/3,745 (6.4%)	0.85 (0.74-0.98)	0.84 (0.73-0.97)	Cefepime, dexamethasone, enoxaparin, piperacillin/tazobactam
60-day mortality					
PS quintile adjusted	635/12,671 (5.0%)	316/3,745 (8.4%)	0.81 (0.70-0.94)	0.81 (0.70-0.93)	Cefepime, dexamethasone, enoxaparin, piperacillin/tazobactam, vancomycin
PS matched	161/2,885 (5.6%)	217/2,860 (7.6%)	0.70 (0.54-0.90)	0.72 (0.57-0.91)	Enoxaparin, vancomycin
IPTW	635/12,671 (5.0%)	316/3,745 (8.4%)	0.85 (0.75-0.97)	0.85 (0.75-0.96)	Cefepime, dexamethasone, enoxaparin, piperacillin/tazobactam, vancomycin
90-day mortality					
PS quintile adjusted	721/12,671 (5.7%)	358/3,745 (9.6%)	0.84 (0.73-0.96)	0.85 (0.74-0.97)	Cefepime, enoxaparin, piperacillin/tazobactam, vancomycin
PS matched	189/2,885 (6.6%)	242/2,860 (8.5%)	0.74 (0.59-0.94)	0.76 (0.61-0.94)	Enoxaparin, piperacillin/tazobactam, vancomycin
IPTW	721/12,671 (5.7%)	358/3,745 (9.6%)	0.88 (0.78-0.99)	0.89 (0.79-1.00)	Enoxaparin, vancomycin
Hospital discharge					
PS quintile adjusted	12,671/14,509 (87.3%)	3,745/4,365 (85.8%)	0.75 (0.72-0.78)	0.75 (0.72-0.78)	Cefepime, enoxaparin, heparin, dexamethasone, hydrocortisone, meropenem, methylprednisolone, piperacillin/tazobactam, vancomycin
PS matched	2,885/3,325 (86.8%)	2,860/3,325 (86.0%)	0.66 (0.61-0.71)	0.66 (0.61-0.71)	Cefepime, enoxaparin, heparin, dexamethasone, hydrocortisone, meropenem, methylprednisolone, piperacillin/tazobactam, vancomycin
IPTW	12,671/14,509 (87.3%)	3,745/4,365 (85.8%)	0.75 (0.73-0.77)	0.75 (0.73-0.77)	Cefepime, enoxaparin, heparin, dexamethasone, hydrocortisone, meropenem, methylprednisolone, piperacillin/tazobactam, prednisone, vancomycin
ICU discharge					
PS quintile adjusted	4,187/5,699 (73.5%)	1,083/1,567 (69.1%)	0.75 (0.70-0.81)	0.74 (0.69-0.80)	Cefepime, enoxaparin, heparin, dexamethasone, hydrocortisone, meropenem,

					methylprednisolone, piperacillin/tazobactam, vancomycin
PS matched	839/1,195 (70.2%)	859/1,231 (69.8%)	0.64 (0.50-0.82)	0.67 (0.53-0.84)	Cefepime, vancomycin
IPTW	4,187/5,699 (73.5%)	1,083/1,567 (69.1%)	0.75 (0.71-0.80)	0.75 (0.71-0.80)	Cefepime, enoxaparin, heparin, dexamethasone, hydrocortisone, meropenem, methylprednisolone, piperacillin/tazobactam, vancomycin
Bacterial infection					
PS quintile adjusted	1,618/14,229 (11.4%)	390/4,257 (9.2%)	1.38 (1.22-1.57)	1.37 (1.22-1.55)	Cefepime, heparin, meropenem, methylprednisolone, piperacillin/tazobactam, vancomycin
PS matched	390/3,249 (12.0%)	281/3,243 (8.7%)	1.78 (1.37-2.31)	1.72 (1.35-2.19)	Heparin, methylprednisolone, vancomycin
IPTW	1,618/14,229 (11.4%)	390/4,257 (9.2%)	1.29 (1.17-1.42)	1.29 (1.17-1.42)	Cefepime, heparin, dexamethasone, hydrocortisone, methylprednisolone, piperacillin/tazobactam, vancomycin
Fungal infection					
PS quintile adjusted	628/14,497 (4.3%)	170/4,359 (3.9%)	1.42 (1.16-1.73)	1.39 (1.15-1.69)	Cefepime, heparin, dexamethasone, meropenem, piperacillin/tazobactam, vancomycin
PS matched	136/3,322 (4.1%)	122/3,321 (3.7%)	1.16 (0.68-1.96)	0.96 (0.62-1.47)	Vancomycin
IPTW	628/14,497 (4.3%)	170/4,359 (3.9%)	1.38 (1.18-1.62)	1.37 (1.17-1.60)	Heparin, dexamethasone, hydrocortisone, meropenem, piperacillin/tazobactam, vancomycin
Acute kidney injury					
PS quintile adjusted	479/7,886 (6.1%)	73/1,784 (4.1%)	1.31 (1.01-1.72)	1.34 (1.03-1.74)	Cefepime, heparin, hydrocortisone, vancomycin
PS matched	92/1,649 (5.6%)	66/1,540 (4.3%)	1.00 (0.06-16.0)	1.00 (0.38-2.66)	No significant variables
IPTW	479/7,886 (6.1%)	73/1,784 (4.1%)	1.06 (0.88-1.28)	1.10 (0.92-1.32)	Enoxaparin, heparin, hydrocortisone, vancomycin
30-day readmission					
PS quintile adjusted	1,363/12,671 (10.8%)	578/3,745 (15.4%)	0.86 (0.77-0.95)	0.86 (0.77-0.95)	Enoxaparin, dexamethasone, prednisone, vancomycin
PS matched	341/2,885 (11.8%)	397/2,860 (13.9%)	0.95 (0.79-1.14)	0.91 (0.77-1.07)	Enoxaparin, heparin
IPTW	1,363/12,671 (10.8%)	578/3,745 (15.4%)	0.92 (0.84-1.00)	0.91 (0.83-1.00)	Enoxaparin, dexamethasone, meropenem, prednisone, vancomycin

^a Model 1: Cox proportional hazards model controlled for concomitant cefepime, dexamethasone, enoxaparin, heparin, hydrocortisone, meropenem, methylprednisolone, piperacillin-tazobactam, prednisone, and vancomycin.

^b Model 2: Cox proportional hazards model controlled for significant (p<0.05) variables from Model 1 using automatic backward elimination.

Table S3. Subgroup analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens, index dates from May 1, 2020 to December 31, 2020 ($n = 7438$)

	No. of events / No. of patients (%)		Hazard ratio	Lower confidence limit	Upper confidence limit
Time-to-event outcomes	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	702/5,531 (12.7%)	265/1,907 (13.9%)	0.812	0.698	0.944
PS matched	199/1,460 (13.6%)	186/1,396 (13.3%)	0.781	0.463	1.318
IPTW	702/5,531 (12.7%)	265/1,907 (13.9%)	0.804	0.708	0.912
30-day mortality					
PS quintile adjusted	206/4,829 (4.3%)	114/1,642 (6.9%)	0.755	0.593	0.96
PS matched	60/1,261 (4.8%)	78/1,210 (6.4%)	0.722	0.436	1.196
IPTW	206/4,829 (4.3%)	114/1,642 (6.9%)	0.787	0.637	0.974
60-day mortality					
PS quintile adjusted	287/4,829 (5.9%)	149/1,642 (9.1%)	0.792	0.643	0.975
PS matched	77/1,261 (6.1%)	101/1,210 (8.3%)	0.62	0.396	0.97
IPTW	287/4,829 (5.9%)	149/1,642 (9.1%)	0.844	0.701	1.016
90-day mortality					
PS quintile adjusted	319/4,829 (6.6%)	167/1,642 (10.2%)	0.794	0.652	0.966
PS matched	86/1,261 (6.8%)	112/1,210 (9.3%)	0.712	0.467	1.085
IPTW	319/4,829 (6.6%)	167/1,642 (10.2%)	0.851	0.714	1.014
Hospital discharge					
PS quintile adjusted	4,829/5,531 (87.3%)	1,642/1,907 (86.1%)	0.847	0.798	0.899
PS matched	1,261/1,460 (86.4%)	1,210/1,396 (86.7%)	0.688	0.586	0.808
IPTW	4,829/5,531 (87.3%)	1,642/1,907 (86.1%)	0.822	0.783	0.863
ICU discharge					
PS quintile adjusted	1,692/2,267 (74.6%)	480/685 (70.1%)	0.924	0.829	1.029
PS matched	399/556 (71.8%)	372/524 (71.0%)	0.787	0.512	1.211
IPTW	1,692/2,267 (74.6%)	480/685 (70.1%)	0.888	0.815	0.968
Bacterial infection					
PS quintile adjusted	615/5,416 (11.4%)	162/1,853 (8.7%)	1.29	1.074	1.55
PS matched	182/1,423 (12.8%)	110/1,359 (8.1%)	2.095	1.246	3.524
IPTW	615/5,416 (11.4%)	162/1,853 (8.7%)	1.291	1.11	1.503
Fungal infection					

PS quintile adjusted	263/5,525 (4.8%)	70/1,905 (3.7%)	1.171	0.886	1.549
PS matched	61/1,459 (4.2%)	44/1,394 (3.2%)	0.833	0.36	1.929
IPTW	263/5,525 (4.8%)	70/1,905 (3.7%)	1.237	0.98	1.562
Acute kidney injury					
PS quintile adjusted	199/2,964 (6.7%)	28/762 (3.7%)	1.337	0.89	2.009
PS matched	41/738 (5.6%)	24/640 (3.8%)	--	--	--
IPTW	199/2,964 (6.7%)	28/762 (3.7%)	1.183	0.885	1.582
30-day readmission					
PS quintile adjusted	554/4,829 (11.5%)	263/1,642 (16.0%)	0.772	0.662	0.901
PS matched	154/1,261 (12.2%)	172/1,210 (14.2%)	0.891	0.606	1.309
IPTW	554/4,829 (11.5%)	263/1,642 (16.0%)	0.842	0.735	0.965

Table S4. Subgroup analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens, index dates from January 1, 2021 to November 30, 2021 (*n* = 11,436)

Time-to-event outcomes	No. of events / No. of patients (%)		Hazard ratio	Lower confidence limit	Upper confidence limit
	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	1,136/8,978 (12.7%)	355/2,458 (14.4%)	0.779	0.686	0.885
PS matched	241/1,865 (12.9%)	279/1,929 (14.5%)	0.607	0.403	0.913
IPTW	1,136/8,978 (12.7%)	355/2,458 (14.4%)	0.784	0.71	0.866
30-day mortality					
PS quintile adjusted	279/7,842 (3.6%)	126/2,103 (6.0%)	0.771	0.615	0.966
PS matched	65/1,624 (4.0%)	88/1,650 (5.3%)	0.659	0.412	1.053
IPTW	279/7,842 (3.6%)	126/2,103 (6.0%)	0.809	0.668	0.979
60-day mortality					
PS quintile adjusted	348/7,842 (4.4%)	167/2,103 (7.9%)	0.737	0.604	0.899
PS matched	84/1,624 (5.2%)	116/1,650 (7%)	0.661	0.436	1.001
IPTW	348/7,842 (4.4%)	167/2,103 (7.9%)	0.775	0.655	0.918
90-day mortality					
PS quintile adjusted	402/7,842 (5.1%)	191/2,103 (9.1%)	0.75	0.623	0.902
PS matched	103/1,624 (6.3%)	130/1,650 (7.9%)	0.735	0.51	1.059
IPTW	402/7,842 (5.1%)	191/2,103 (9.1%)	0.798	0.681	0.935
Hospital discharge					
PS quintile adjusted	7,842/8,978 (87.3%)	2,103/2,458 (85.6%)	0.876	0.832	0.922
PS matched	1,624/1,865 (87.1%)	1,650/1,929 (85.5%)	0.75	0.665	0.845
IPTW	7,842/8,978 (87.3%)	2,103/2,458 (85.6%)	0.885	0.851	0.921
ICU discharge					
PS quintile adjusted	2,495/3,432 (72.7%)	603/882 (68.4%)	0.941	0.857	1.034
PS matched	440/639 (68.9%)	487/707 (68.9%)	0.687	0.472	0.999
IPTW	2,495/3,432 (72.7%)	603/882 (68.4%)	0.955	0.889	1.024
Bacterial infection					
PS quintile adjusted	1,003/8,813 (11.4%)	228/2,404 (9.5%)	1.055	0.906	1.229
PS matched	208/1,826 (11.4%)	171/1,884 (9.1%)	1.304	0.888	1.915

IPTW	1,003/8,813 (11.4%)	228/2,404 (9.5%)	1.005	0.897	1.126
Fungal infection					
PS quintile adjusted	365/8,972 (4.1%)	100/2,454 (4.1%)	0.861	0.68	1.089
PS matched	75/1,863 (4.0%)	78/1,927 (4.0%)	0.684	0.338	1.385
IPTW	365/8,972 (4.1%)	100/2,454 (4.1%)	0.857	0.715	1.028
Acute kidney injury					
PS quintile adjusted	280/4,922 (5.7%)	45/1,022 (4.4%)	0.833	0.602	1.152
PS matched	51/911 (5.6%)	42/900 (4.7%)	1	0.202	4.955
IPTW	280/4,922 (5.7%)	45/1,022 (4.4%)	0.74	0.596	0.919
30-day readmission					
PS quintile adjusted	809/7,842 (10.3%)	315/2,103 (15.0%)	0.822	0.715	0.944
PS matched	187/1,624 (11.5%)	225/1,650 (13.6%)	0.826	0.625	1.092
IPTW	809/7,842 (10.3%)	315/2,103 (15.0%)	0.865	0.77	0.972

Table S5. Subgroup analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens, supplemental oxygen at baseline (*n* = 13,922)

	No. of events / No. of patients (%)		Hazard ratio	Lower confidence limit	Upper confidence limit
Time-to-event outcomes	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	1,100/11,029 (10.0%)	365/2,893 (12.6%)	0.733	0.646	0.832
PS matched	242/2,357 (10.3%)	284/2,381 (11.9%)	0.625	0.439	0.89
IPTW	1,100/11,029 (10.0%)	365/2,893 (12.6%)	0.744	0.673	0.823
30-day mortality					
PS quintile adjusted	358/9,929 (3.6%)	168/2,528 (6.6%)	0.7	0.577	0.848
PS matched	92/2,115 (4.3%)	127/2,097 (6.1%)	0.58	0.405	0.831
IPTW	358/9,929 (3.6%)	168/2,528 (6.6%)	0.709	0.601	0.837
60-day mortality					
PS quintile adjusted	467/9,929 (4.7%)	217/2,528 (8.6%)	0.706	0.596	0.836
PS matched	114/2,115 (5.4%)	165/2,097 (7.9%)	0.54	0.388	0.752
IPTW	467/9,929 (4.7%)	217/2,528 (8.6%)	0.724	0.626	0.838
90-day mortality					
PS quintile adjusted	540/9,929 (5.4%)	246/2,528 (9.7%)	0.727	0.621	0.852
PS matched	136/2,115 (6.4%)	184/2,097 (8.8%)	0.538	0.396	0.731
IPTW	540/9,929 (5.4%)	246/2,528 (9.7%)	0.755	0.659	0.865
Hospital discharge					
PS quintile adjusted	9,929/11,029 (90%)	2,528/2,893 (87.4%)	0.874	0.835	0.915
PS matched	2,115/2,357 (89.7%)	2,097/2,381 (88.1%)	0.751	0.683	0.826
IPTW	9,929/11,029 (90%)	2,528/2,893 (87.4%)	0.867	0.837	0.898
ICU discharge					
PS quintile adjusted	2,894/3,764 (76.9%)	666/933 (71.4%)	0.92	0.841	1.006
PS matched	519/704 (73.7%)	562/775 (72.5%)	0.821	0.597	1.129
IPTW	2,894/3,764 (76.9%)	666/933 (71.4%)	0.913	0.854	0.976
Bacterial infection					
PS quintile adjusted	997/10,858 (9.2%)	214/2,834 (7.6%)	1.151	0.985	1.346
PS matched	232/2,318 (10.0%)	163/2,338 (7.0%)	1.415	0.995	2.012
IPTW	997/10,858 (9.2%)	214/2,834 (7.6%)	1.126	1.002	1.266
Fungal infection					

PS quintile adjusted	374/11,022 (3.4%)	92/2,891 (3.2%)	0.929	0.73	1.183
PS matched	75/2,356 (3.2%)	70/2,380 (2.9%)	0.8	0.415	1.544
IPTW	374/11,022 (3.4%)	92/2,891 (3.2%)	0.964	0.8	1.162
Acute kidney injury					
PS quintile adjusted	255/6,077 (4.2%)	44/1,211 (3.6%)	0.739	0.533	1.024
PS matched	46/1,180 (3.9%)	43/1,126 (3.8%)	1.333	0.298	5.957
IPTW	255/6,077 (4.2%)	44/1,211 (3.6%)	0.65	0.521	0.81
30-day readmission					
PS quintile adjusted	1,074/9,929 (10.8%)	414/2,528 (16.4%)	0.765	0.679	0.861
PS matched	249/2,115 (11.8%)	306/2,097 (14.6%)	0.778	0.623	0.973
IPTW	1,074/9,929 (10.8%)	414/2,528 (16.4%)	0.829	0.75	0.917

Table S6. Subgroup analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens, no supplemental oxygen at baseline (*n* = 2500)

Time-to-event outcomes	No. of events / No. of patients (%)		Hazard ratio	Lower confidence limit	Upper confidence limit
	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	152/1,531 (9.9%)	72/969 (7.4%)	1.028	0.76	1.39
PS matched	55/582 (9.5%)	35/528 (6.6%)	0.25	0.028	2.237
IPTW	152/1,531 (9.9%)	72/969 (7.4%)	0.978	0.745	1.285
30-day mortality					
PS quintile adjusted	55/1,379 (4%)	50/897 (5.6%)	0.883	0.593	1.313
PS matched	21/527 (4%)	24/493 (4.9%)	1.75	0.512	5.978
IPTW	55/1,379 (4%)	50/897 (5.6%)	1.086	0.749	1.575
60-day mortality					
PS quintile adjusted	76/1,379 (5.5%)	73/897 (8.1%)	0.811	0.581	1.132
PS matched	32/527 (6.1%)	34/493 (6.9%)	1.286	0.479	3.452
IPTW	76/1,379 (5.5%)	73/897 (8.1%)	0.955	0.696	1.312
90-day mortality					
PS quintile adjusted	82/1,379 (5.9%)	80/897 (8.9%)	0.802	0.582	1.104
PS matched	37/527 (7%)	36/493 (7.3%)	1.375	0.553	3.418
IPTW	82/1,379 (5.9%)	80/897 (8.9%)	0.948	0.699	1.286
Hospital discharge					
PS quintile adjusted	1,379/1,531 (90.1%)	897/969 (92.6%)	0.77	0.703	0.842
PS matched	527/582 (90.5%)	493/528 (93.4%)	0.55	0.402	0.754
IPTW	1,379/1,531 (90.1%)	897/969 (92.6%)	0.743	0.684	0.807
ICU discharge					
PS quintile adjusted	487/612 (79.6%)	228/281 (81.1%)	0.793	0.672	0.935
PS matched	181/227 (79.7%)	143/169 (84.6%)	0.4	0.125	1.275
IPTW	487/612 (79.6%)	228/281 (81.1%)	0.754	0.649	0.875
Bacterial infection					
PS quintile adjusted	162/1,506 (10.8%)	65/954 (6.8%)	1.455	1.075	1.971
PS matched	68/571 (11.9%)	30/519 (5.8%)	1.75	0.512	5.978
IPTW	162/1,506 (10.8%)	65/954 (6.8%)	1.491	1.108	2.006
Fungal infection					
PS quintile adjusted	52/1,531 (3.4%)	20/969 (2.1%)	1.318	0.754	2.302
PS matched	16/582 (2.7%)	6/528 (1.1%)	2	0.181	22.053
IPTW	52/1,531 (3.4%)	20/969 (2.1%)	1.701	0.977	2.964

Acute kidney injury					
PS quintile adjusted	47/840 (5.6%)	8/416 (1.9%)	2.207	0.994	4.899
PS matched	15/311 (4.8%)	4/270 (1.5%)	--	--	--
IPTW	47/840 (5.6%)	8/416 (1.9%)	2.196	1.088	4.434
30-day readmission					
PS quintile adjusted	149/1,379 (10.8%)	131/897 (14.6%)	0.739	0.577	0.946
PS matched	60/527 (11.4%)	67/493 (13.6%)	1.364	0.626	2.969
IPTW	149/1,379 (10.8%)	131/897 (14.6%)	0.736	0.585	0.927

Table S7. Subgroup analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens, non-invasive mechanical ventilation at baseline (*n* = 1678)

	No. of events / No. of patients (%)		Hazard ratio	Lower confidence limit	Upper confidence limit
Time-to-event outcomes	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	285/1,363 (20.9%)	74/315 (23.5%)	0.836	0.636	1.099
PS matched	56/233 (24%)	59/268 (22%)	0.667	0.111	3.99
IPTW	285/1,363 (20.9%)	74/315 (23.5%)	0.888	0.719	1.097
30-day mortality					
PS quintile adjusted	53/1,078 (4.9%)	14/241 (5.8%)	1.071	0.576	1.993
PS matched	7/177 (4%)	9/209 (4.3%)	--	--	--
IPTW	53/1,078 (4.9%)	14/241 (5.8%)	1.356	0.807	2.281
60-day mortality					
PS quintile adjusted	68/1,078 (6.3%)	17/241 (7.1%)	1.102	0.632	1.921
PS matched	10/177 (5.6%)	11/209 (5.3%)	--	--	--
IPTW	68/1,078 (6.3%)	17/241 (7.1%)	1.421	0.893	2.262
90-day mortality					
PS quintile adjusted	72/1,078 (6.7%)	22/241 (9.1%)	0.907	0.55	1.497
PS matched	10/177 (5.6%)	15/209 (7.2%)	--	--	--
IPTW	72/1,078 (6.7%)	22/241 (9.1%)	1.223	0.793	1.885
Hospital discharge					
PS quintile adjusted	1,078/1,363 (79.1%)	241/315 (76.5%)	0.86	0.742	0.997
PS matched	177/233 (76%)	209/268 (78%)	0.875	0.317	2.413
IPTW	1,078/1,363 (79.1%)	241/315 (76.5%)	0.84	0.754	0.936
ICU discharge					
PS quintile adjusted	513/755 (67.9%)	108/172 (62.8%)	0.977	0.784	1.216
PS matched	68/114 (59.6%)	89/141 (63.1%)	2	0.181	22.053
IPTW	513/755 (67.9%)	108/172 (62.8%)	0.952	0.813	1.115
Bacterial infection					
PS quintile adjusted	200/1,334 (15%)	46/304 (15.1%)	0.874	0.624	1.224
PS matched	31/221 (14%)	35/258 (13.6%)	--	--	--
IPTW	200/1,334 (15%)	46/304 (15.1%)	0.839	0.654	1.075
Fungal infection					
PS quintile adjusted	72/1,363 (5.3%)	15/315 (4.8%)	0.987	0.548	1.779
PS matched	10/233 (4.3%)	11/268 (4.1%)	--	--	--
IPTW	72/1,363 (5.3%)	15/315 (4.8%)	1.084	0.692	1.697

Acute kidney injury					
PS quintile adjusted	69/696 (9.9%)	7/104 (6.7%)	1.046	0.474	2.307
PS matched	7/100 (7%)	7/97 (7.2%)	--	--	--
IPTW	69/696 (9.9%)	7/104 (6.7%)	1.163	0.685	1.972
30-day readmission					
PS quintile adjusted	114/1,078 (10.6%)	27/241 (11.2%)	1.168	0.752	1.814
PS matched	25/177 (14.1%)	22/209 (10.5%)	1	0.063	15.988
IPTW	114/1,078 (10.6%)	27/241 (11.2%)	1.361	0.966	1.916

Table S8. Subgroup analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens, invasive mechanical ventilation/ECMO at baseline (*n* = 774)

Time-to-event outcomes	No. of events / No. of patients (%)		Hazard ratio	Lower confidence limit	Upper confidence limit
	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	301/586 (51.4%)	109/188 (58.0%)	0.825	0.656	1.037
PS matched	87/153 (56.9%)	87/148 (58.8%)	1.5	0.423	5.315
IPTW	301/586 (51.4%)	109/188 (58.0%)	0.816	0.674	0.987
30-day mortality					
PS quintile adjusted	19/285 (6.7%)	8/79 (10.1%)	0.787	0.333	1.86
PS matched	5/66 (7.6%)	6/61 (9.8%)	--	--	--
IPTW	19/285 (6.7%)	8/79 (10.1%)	0.877	0.406	1.896
60-day mortality					
PS quintile adjusted	24/285 (8.4%)	9/79 (11.4%)	0.92	0.415	2.038
PS matched	5/66 (7.6%)	7/61 (11.5%)	--	--	--
IPTW	24/285 (8.4%)	9/79 (11.4%)	1.074	0.538	2.146
90-day mortality					
PS quintile adjusted	27/285 (9.5%)	10/79 (12.7%)	1.008	0.474	2.14
PS matched	6/66 (9.1%)	7/61 (11.5%)	--	--	--
IPTW	27/285 (9.5%)	10/79 (12.7%)	1.149	0.592	2.232
Hospital discharge					
PS quintile adjusted	285/586 (48.6%)	79/188 (42%)	1.112	0.856	1.446
PS matched	66/153 (43.1%)	61/148 (41.2%)	4	0.447	35.786
IPTW	285/586 (48.6%)	79/188 (42%)	1.085	0.879	1.341
ICU discharge					
PS quintile adjusted	293/568 (51.6%)	81/181 (44.8%)	1.129	0.873	1.459
PS matched	71/150 (47.3%)	65/146 (44.5%)	4	0.447	35.786
IPTW	293/568 (51.6%)	81/181 (44.8%)	1.132	0.919	1.394
Bacterial infection					
PS quintile adjusted	259/531 (48.8%)	65/165 (39.4%)	1.125	0.85	1.489
PS matched	59/139 (42.4%)	53/128 (41.4%)	2	0.366	10.918
IPTW	259/531 (48.8%)	65/165 (39.4%)	1.099	0.881	1.371
Fungal infection					
PS quintile adjusted	130/581 (22.4%)	43/184 (23.4%)	0.944	0.661	1.349
PS matched	35/151 (23.2%)	35/145 (24.1%)	0.8	0.215	2.979
IPTW	130/581 (22.4%)	43/184 (23.4%)	0.881	0.658	1.18
Acute kidney injury					
PS quintile adjusted	108/273 (39.6%)	14/53 (26.4%)	1.654	0.935	2.925

PS matched	24/58 (41.4%)	12/47 (25.5%)	--	--	--
IPTW	108/273 (39.6%)	14/53 (26.4%)	1.389	0.934	2.064
30-day readmission					
PS quintile adjusted	26/285 (9.1%)	6/79 (7.6%)	1.79	0.711	4.506
PS matched	7/66 (10.6%)	2/61 (3.3%)	--	--	--
IPTW	26/285 (9.1%)	6/79 (7.6%)	2.766	1.119	6.842

Table S9. Subgroup analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens, unvaccinated (*n* = 15,989)

	No. of events / No. of patients (%)		Hazard ratio	Lower confidence limit	Upper confidence limit
Time-to-event outcomes	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	1,629/12,402 (13.1%)	528/3,587 (14.7%)	0.816	0.735	0.906
PS matched	383/2,824 (13.6%)	405/2,798 (14.5%)	0.664	0.508	0.868
IPTW	1,629/12,402 (13.1%)	528/3,587 (14.7%)	0.807	0.743	0.878
30-day mortality					
PS quintile adjusted	421/10,773 (3.9%)	200/3,059 (6.5%)	0.749	0.626	0.895
PS matched	103/2,441 (4.2%)	146/2,393 (6.1%)	0.597	0.442	0.805
IPTW	421/10,773 (3.9%)	200/3,059 (6.5%)	0.775	0.666	0.903
60-day mortality					
PS quintile adjusted	542/10,773 (5%)	262/3,059 (8.6%)	0.738	0.631	0.863
PS matched	131/2,441 (5.4%)	190/2,393 (7.9%)	0.579	0.443	0.758
IPTW	542/10,773 (5%)	262/3,059 (8.6%)	0.777	0.679	0.889
90-day mortality					
PS quintile adjusted	610/10,773 (5.7%)	294/3,059 (9.6%)	0.745	0.643	0.863
PS matched	149/2,441 (6.1%)	211/2,393 (8.8%)	0.616	0.479	0.793
IPTW	610/10,773 (5.7%)	294/3,059 (9.6%)	0.79	0.695	0.898
Hospital discharge					
PS quintile adjusted	10,773/12,402 (86.9%)	3,059/3,587 (85.3%)	0.874	0.837	0.912
PS matched	2,441/2,824 (86.4%)	2,393/2,798 (85.5%)	0.742	0.684	0.806
IPTW	10,773/12,402 (86.9%)	3,059/3,587 (85.3%)	0.866	0.838	0.896
ICU discharge					
PS quintile adjusted	3,622/4,971 (72.9%)	904/1,320 (68.5%)	0.958	0.887	1.035
PS matched	719/1,033 (69.6%)	732/1,060 (69.1%)	0.733	0.571	0.94
IPTW	3,622/4,971 (72.9%)	904/1,320 (68.5%)	0.945	0.891	1.002
Bacterial infection					
PS quintile adjusted	1,418/12,167 (11.7%)	329/3,498 (9.4%)	1.148	1.011	1.303

PS matched	341/2,757 (12.4%)	247/2,728 (9.1%)	1.424	1.101	1.842
IPTW	1,418/12,167 (11.7%)	329/3,498 (9.4%)	1.082	0.982	1.193
Fungal infection					
PS quintile adjusted	552/12,393 (4.5%)	140/3,583 (3.9%)	1.042	0.856	1.269
PS matched	117/2,822 (4.1%)	107/2,794 (3.8%)	0.708	0.456	1.099
IPTW	552/12,393 (4.5%)	140/3,583 (3.9%)	1.045	0.895	1.219
Acute kidney injury					
PS quintile adjusted	442/6,899 (6.4%)	64/1,526 (4.2%)	1.077	0.822	1.411
PS matched	87/1,448 (6%)	58/1,333 (4.4%)	1.143	0.414	3.152
IPTW	442/6,899 (6.4%)	64/1,526 (4.2%)	0.958	0.797	1.151
30-day readmission					
PS quintile adjusted	1,100/10,773 (10.2%)	447/3,059 (14.6%)	0.796	0.708	0.894
PS matched	268/2,441 (11%)	319/2,393 (13.3%)	0.807	0.663	0.982
IPTW	1,100/10,773 (10.2%)	447/3,059 (14.6%)	0.854	0.774	0.943

Table S10. Subgroup analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens, fully vaccinated ($n = 2355$)

	No. of events / No. of patients (%)		Hazard ratio	Lower confidence limit	Upper confidence limit
Time-to-event outcomes	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	205/1,690 (12.1%)	91/665 (13.7%)	0.607	0.46	0.801
PS matched	56/411 (13.6%)	59/441 (13.4%)	0.667	0.111	3.99
IPTW	205/1,690 (12.1%)	91/665 (13.7%)	0.623	0.497	0.781
30-day mortality					
PS quintile adjusted	61/1,485 (4.1%)	39/574 (6.8%)	0.852	0.555	1.309
PS matched	21/355 (5.9%)	19/382 (5%)	1	0.25	3.998
IPTW	61/1,485 (4.1%)	39/574 (6.8%)	0.96	0.642	1.436
60-day mortality					
PS quintile adjusted	90/1,485 (6.1%)	50/574 (8.7%)	0.966	0.667	1.398
PS matched	29/355 (8.2%)	25/382 (6.5%)	0.8	0.215	2.979
IPTW	90/1,485 (6.1%)	50/574 (8.7%)	1.1	0.781	1.548
90-day mortality					
PS quintile adjusted	107/1,485 (7.2%)	59/574 (10.3%)	0.973	0.693	1.368
PS matched	39/355 (11%)	29/382 (7.6%)	1	0.323	3.101
IPTW	107/1,485 (7.2%)	59/574 (10.3%)	1.1	0.806	1.503
Hospital discharge					
PS quintile adjusted	1,485/1,690 (87.9%)	574/665 (86.3%)	0.789	0.71	0.876
PS matched	355/411 (86.4%)	382/441 (86.6%)	0.61	0.371	1.003
IPTW	1,485/1,690 (87.9%)	574/665 (86.3%)	0.796	0.73	0.869
ICU discharge					
PS quintile adjusted	455/614 (74.1%)	146/213 (68.5%)	0.799	0.654	0.976
PS matched	100/141 (70.9%)	100/143 (69.9%)	1	0.063	15.988
IPTW	455/614 (74.1%)	146/213 (68.5%)	0.815	0.692	0.959
Bacterial infection					
PS quintile adjusted	166/1,652 (10%)	54/649 (8.3%)	1.106	0.794	1.541
PS matched	42/402 (10.4%)	27/432 (6.3%)	2.5	0.485	12.886
IPTW	166/1,652 (10%)	54/649 (8.3%)	1.238	0.931	1.648
Fungal infection					
PS quintile adjusted	72/1,687 (4.3%)	27/663 (4.1%)	0.752	0.462	1.222
PS matched	18/410 (4.4%)	12/441 (2.7%)	1	0.063	15.988
IPTW	72/1,687 (4.3%)	27/663 (4.1%)	0.783	0.522	1.175

Acute kidney injury					
PS quintile adjusted	35/779 (4.5%)	8/217 (3.7%)	0.781	0.344	1.775
PS matched	5/165 (3%)	7/172 (4.1%)	--	--	--
IPTW	35/779 (4.5%)	8/217 (3.7%)	0.537	0.314	0.919
30-day readmission					
PS quintile adjusted	206/1,485 (13.9%)	109/574 (19%)	0.827	0.643	1.063
PS matched	56/355 (15.8%)	63/382 (16.5%)	1	0.323	3.101
IPTW	206/1,485 (13.9%)	109/574 (19%)	0.868	0.695	1.083

Table S11. Sensitivity analyses of time-to-event outcomes among hospitalized patients with COVID-19 and treated with remdesivir-based regimens and non-remdesivir-based regimens, controlling for corticosteroid duration

	No. of events / No. of patients (%)		Hazard ratio	Lower confidence limit	Upper confidence limit
Time-to-event outcomes	Remdesivir	Non-remdesivir			
Inpatient mortality					
PS quintile adjusted	1,838/14,509 (12.7%)	620/4,365 (14.2%)	0.821	0.745	0.905
PS matched	440/3,325 (13.2%)	465/3,325 (14.0%)	0.829	0.633	1.084
IPTW	1,838/14,509 (12.7%)	620/4,365 (14.2%)	0.823	0.761	0.89
30-day mortality					
PS quintile adjusted	485/12,671 (3.8%)	240/3,745 (6.4%)	0.739	0.627	0.872
PS matched	125/2,885 (4.3%)	166/2,860 (5.8%)	0.671	0.517	0.872
IPTW	485/12,671 (3.8%)	240/3,745 (6.4%)	0.776	0.673	0.895
60-day mortality					
PS quintile adjusted	635/12,671 (5.0%)	316/3,745 (8.4%)	0.737	0.638	0.851
PS matched	161/2,885 (5.6%)	217/2,860 (7.6%)	0.654	0.518	0.825
IPTW	635/12,671 (5.0%)	316/3,745 (8.4%)	0.781	0.689	0.885
90-day mortality					
PS quintile adjusted	721/12,671 (5.7%)	358/3,745 (9.6%)	0.745	0.651	0.852
PS matched	189/2,885 (6.6%)	242/2,860 (8.5%)	0.702	0.567	0.868
IPTW	721/12,671 (5.7%)	358/3,745 (9.6%)	0.796	0.707	0.895
Hospital discharge					
PS quintile adjusted	12,671/14,509 (87.3%)	3,745/4,365 (85.8%)	1.124	1.08	1.169
PS matched	2,885/3,325 (86.8%)	2,860/3,325 (86.0%)	1.102	1.000	1.215
IPTW	12,671/14,509 (87.3%)	3,745/4,365 (85.8%)	1.076	1.042	1.11
ICU discharge					
PS quintile adjusted	4,187/5,699 (73.5%)	1,083/1,567 (69.1%)	1.118	1.041	1.201
PS matched	839/1,195 (70.2%)	859/1,231 (69.8%)	1.058	0.819	1.368
IPTW	4,187/5,699 (73.5%)	1,083/1,567 (69.1%)	1.092	1.034	1.154
Bacterial infection					
PS quintile adjusted	1,618/14,229 (11.4%)	390/4,257 (9.2%)	1.142	1.015	1.285
PS matched	390/3,249 (12.0%)	281/3,243 (8.7%)	1.367	1.093	1.71
IPTW	1,618/14,229 (11.4%)	390/4,257 (9.2%)	1.086	0.992	1.189
Fungal infection					
PS quintile adjusted	628/14,497 (4.3%)	170/4,359 (3.9%)	0.966	0.806	1.157
PS matched	136/3,322 (4.1%)	122/3,321 (3.7%)	0.797	0.538	1.181
IPTW	628/14,497 (4.3%)	170/4,359 (3.9%)	0.964	0.836	1.112

Acute kidney injury					
PS quintile adjusted	479/7,886 (6.1%)	73/1,784 (4.1%)	1.052	0.816	1.356
PS matched	92/1,649 (5.6%)	66/1,540 (4.3%)	0.98	0.358	2.68
IPTW	479/7,886 (6.1%)	73/1,784 (4.1%)	0.895	0.754	1.064
30-day readmission					
PS quintile adjusted	1,363/12,671 (10.8%)	578/3,745 (15.4%)	0.811	0.731	0.9
PS matched	341/2,885 (11.8%)	397/2,860 (13.9%)	0.813	0.689	0.959
IPTW	1,363/12,671 (10.8%)	578/3,745 (15.4%)	0.88	0.805	0.962