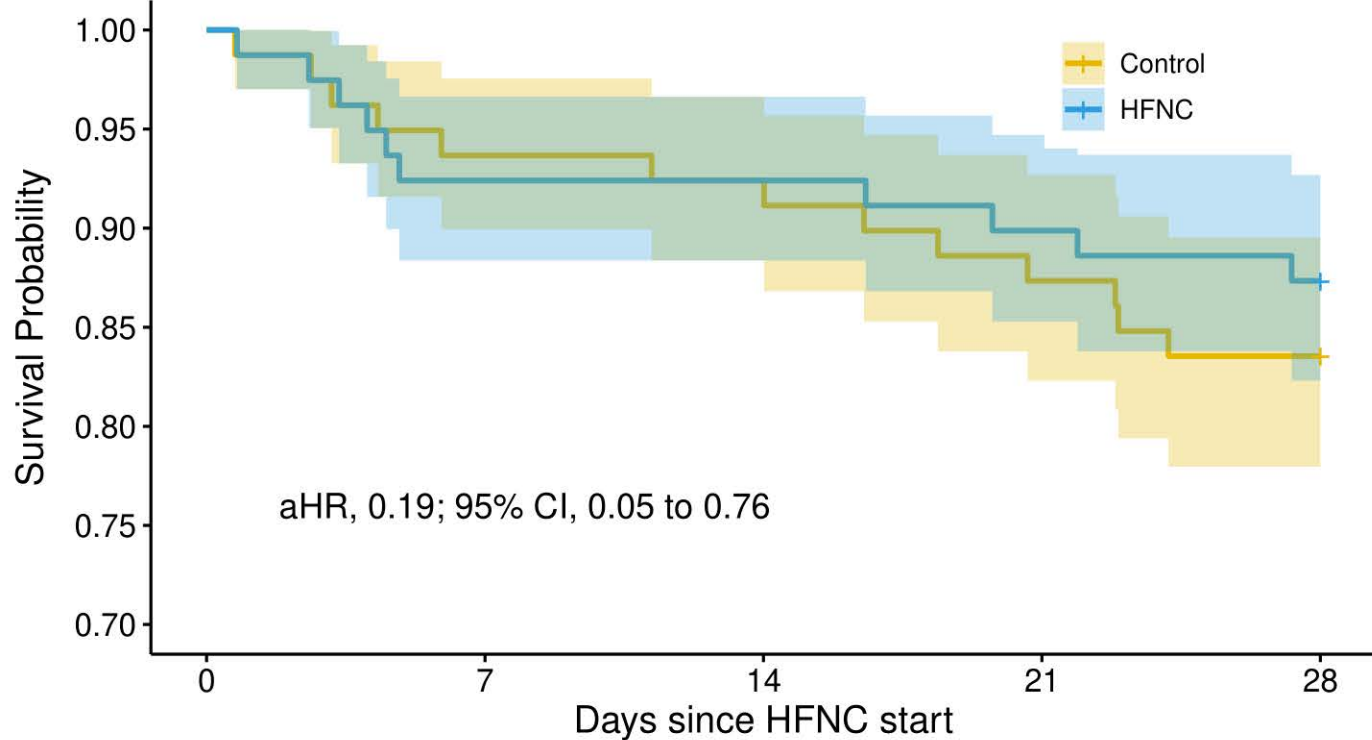


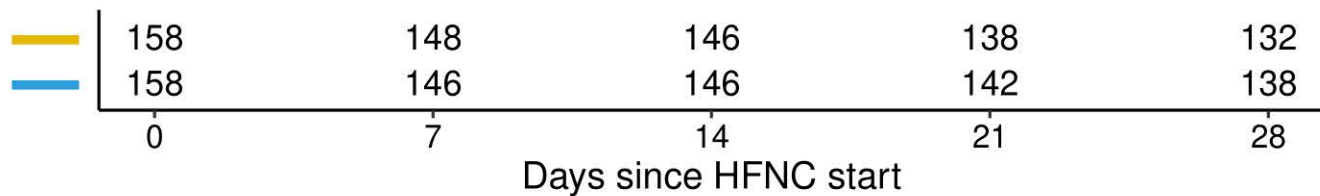
Supplemental Table 1: ICD-10 codes indicating symptomatic disease

ICD10 code	Diagnosis name
A41.89	Other specified sepsis
A41.9	Sepsis, unspecified organism
B97.89	Other viral agents as the cause of diseases classified elsewhere
D72.810	Lymphocytopenia
E84.9	Cystic fibrosis, unspecified
E86.0	Dehydration
E86.9	Volume depletion, unspecified
E87.1	Hypo-osmolality and hyponatremia
E87.2	Acidosis
I95.9	Hypotension, unspecified
J12.81	Pneumonia due to SARS-associated coronavirus
J12.89	Other viral pneumonia
J12.9	Viral pneumonia, unspecified
J15.9	Unspecified bacterial pneumonia
J16.8	Pneumonia due to other specified infectious organisms
J18.1	Lobar pneumonia, unspecified organism
J18.9	Pneumonia, unspecified organism
J22	Unspecified acute lower respiratory infection
J80	Acute respiratory distress syndrome
J95.851	Ventilator associated pneumonia
J96.01	Acute respiratory failure with hypoxia
J96.21	Acute and chronic respiratory failure with hypoxia
J96.91	Respiratory failure, unspecified with hypoxia
J98.8	Other specified respiratory disorders
J98.9	Respiratory disorder, unspecified
R00.0	Tachycardia, unspecified
R05	Cough
R06.02	Shortness of breath
R06.03	Acute respiratory distress
R09.02	Hypoxemia
R19.7	Diarrhea, unspecified
R41.82	Altered mental status, unspecified
R50.81	Fever presenting with conditions classified elsewhere
R50.9	Fever, unspecified
R53.1	Weakness
R55	Syncope and collapse
R57.9	Shock, unspecified
R65.20	Severe sepsis without septic shock
R65.21	Severe sepsis with septic shock
T86.812	Lung transplant infection
Z51.5	Encounter for palliative care
Z99.11	Dependence on respirator (ventilator) status
Z99.81	Dependence on supplemental oxygen

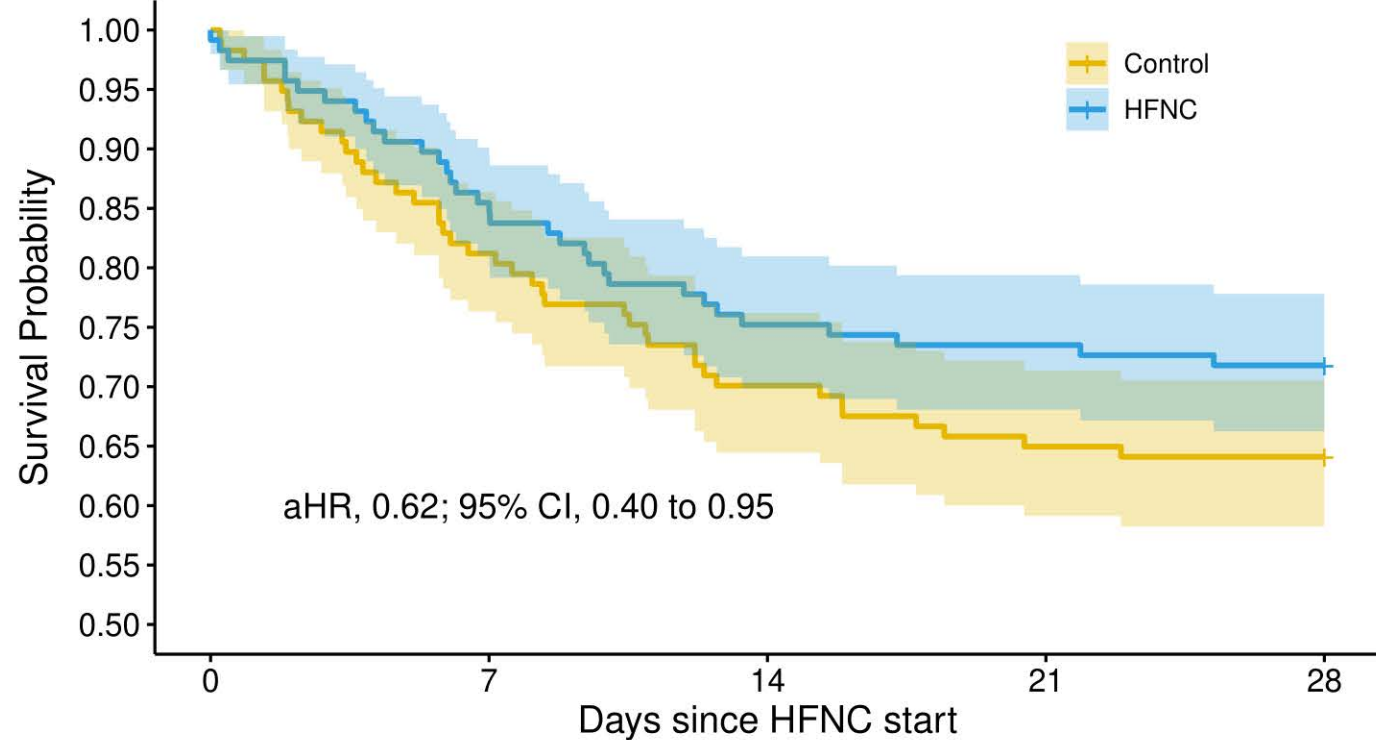
A. Academic hospitals



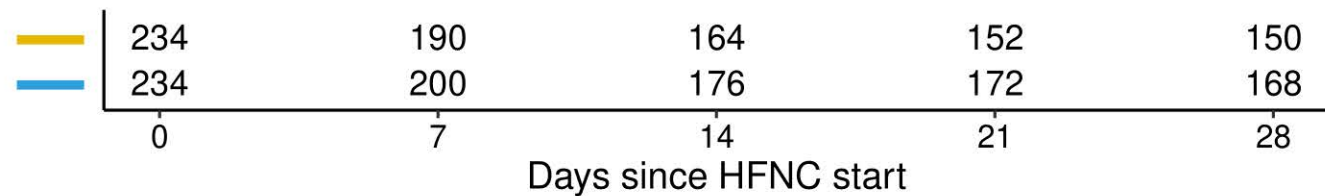
Number at risk



B. Community hospitals



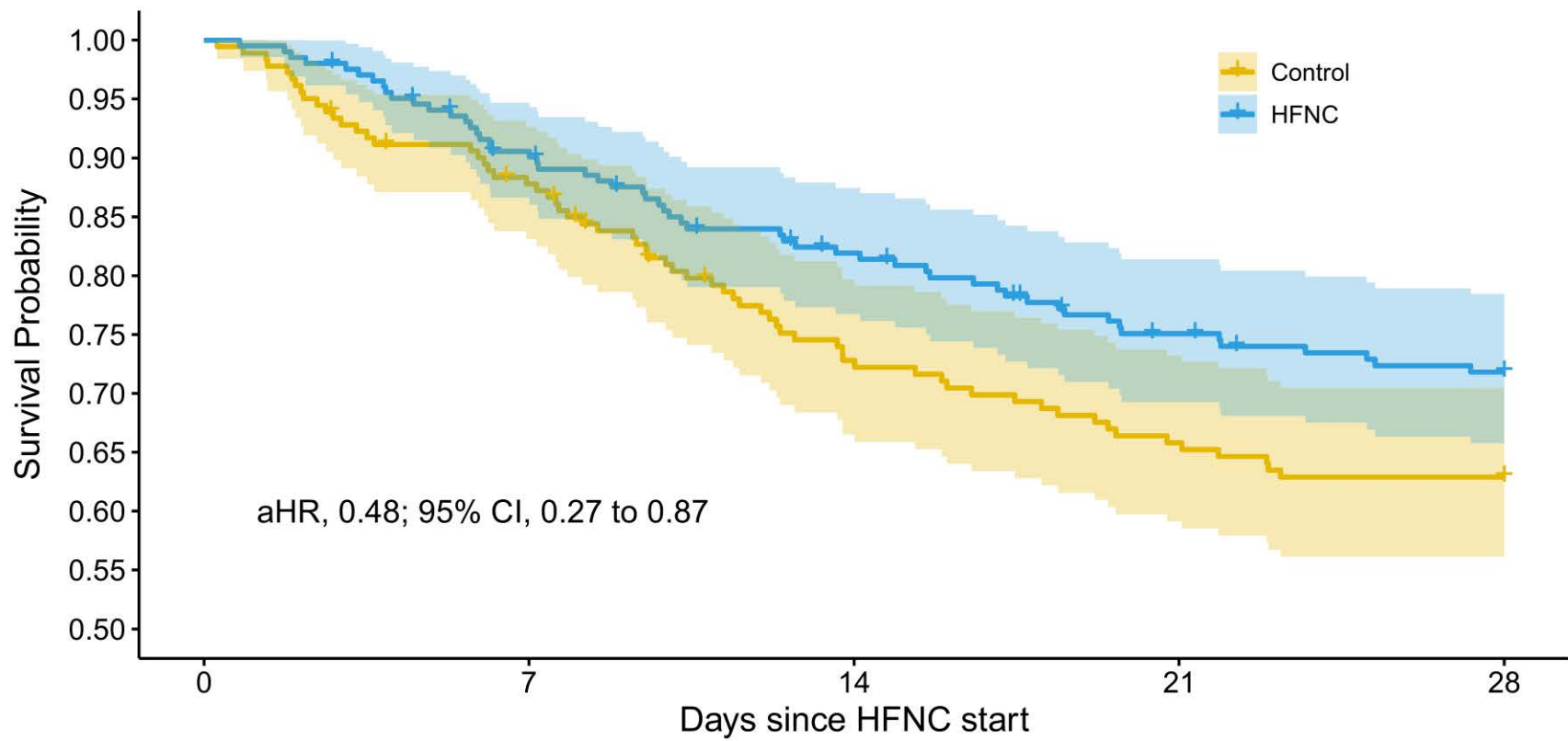
Number at risk



Supplemental Figure Legends

Supplemental Figure 1: Time to death stratified by hospital type

The Johns Hopkins Health System (JHHS) includes two academic hospitals (Johns Hopkins Hospital and Bayview Medical Center) and three community hospitals (Howard County General Hospital, Suburban Hospital, Sibley Memorial Hospital). aHR = adjusted hazard ratio; CI = confidence interval, HFNC = High-flow nasal cannula.



Number at risk

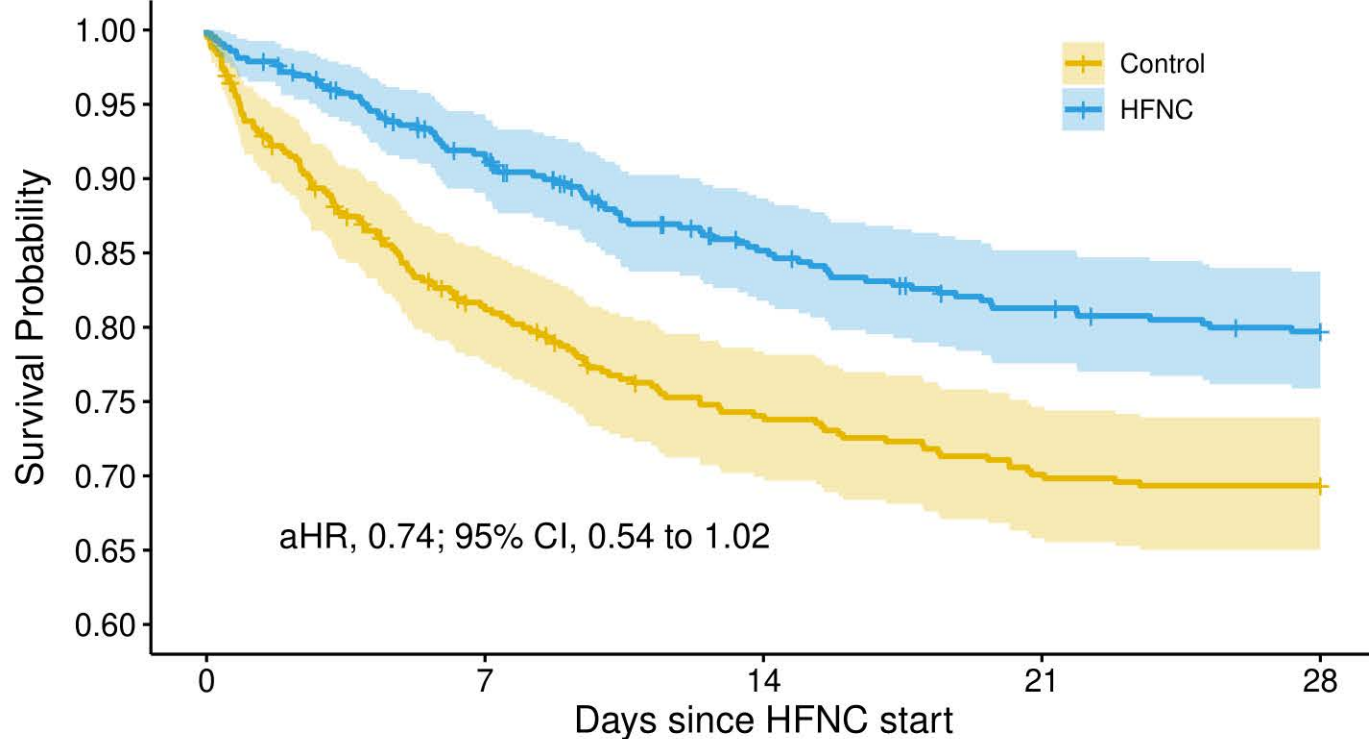
Days since HFNC start	0	7	14	21	28
Control (Yellow)	181	156	125	113	108
HFNC (Blue)	203	180	158	140	132

HIGH-FLOW NASAL CANNULA IN COVID-19 PNEUMONIA

Supplemental Figure 2: Time to death in patients who progressed to invasive mechanical ventilation (IMV)

To explore the effect of HFNC in the subset of patients who progressed to IMV, a hazard ratio for death was calculated for these patients compared to their matched controls. aHR = adjusted hazard ratio; CI = confidence interval, HFNC = High-flow nasal cannula, IMV = invasive mechanical ventilation.

A. Survival curve including patients who died within 24 hours

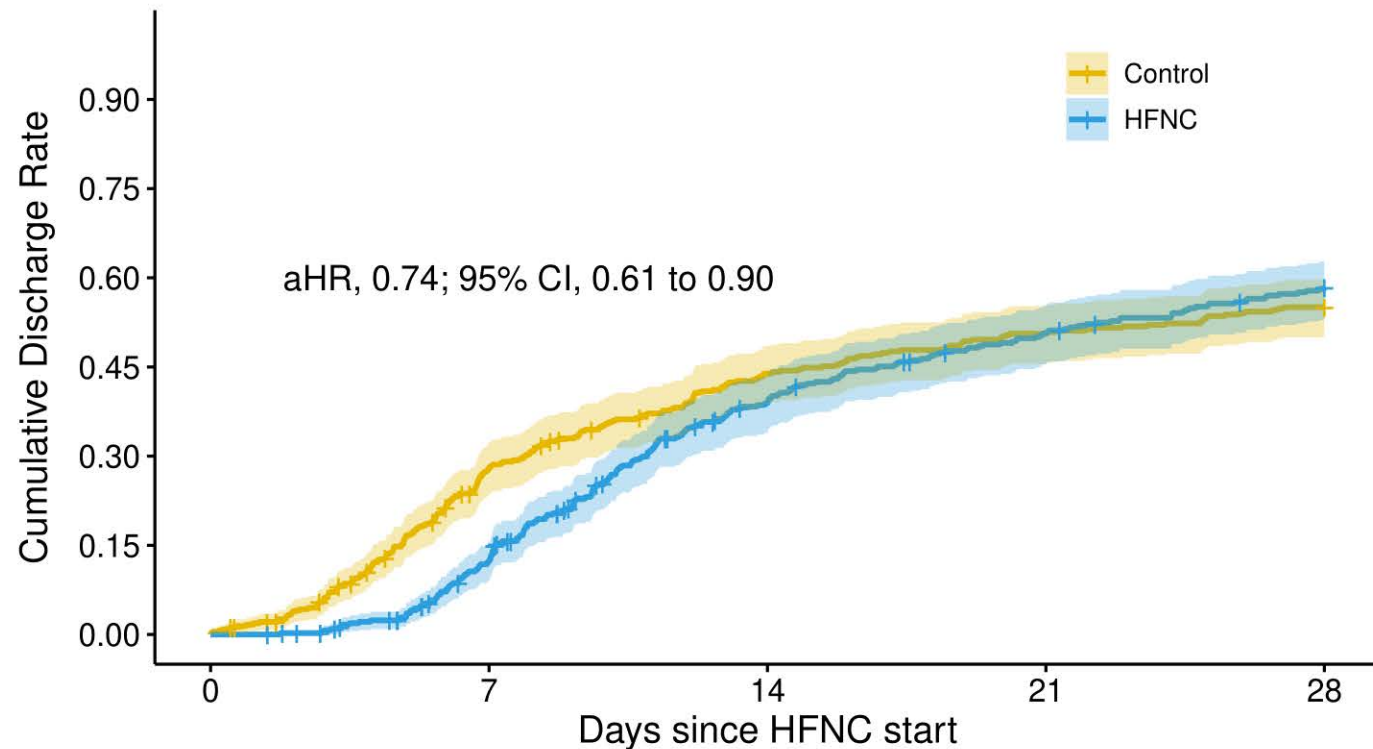


Number at risk

Control	425	333	299	283	280
HFNC	425	377	332	313	304
	0	7	14	21	28

Days since HFNC start

B. Cumulative discharge curve including patients who died within 24 hours



Number at risk

Control	425	295	226	199	181
HFNC	425	361	235	187	155
	0	7	14	21	28

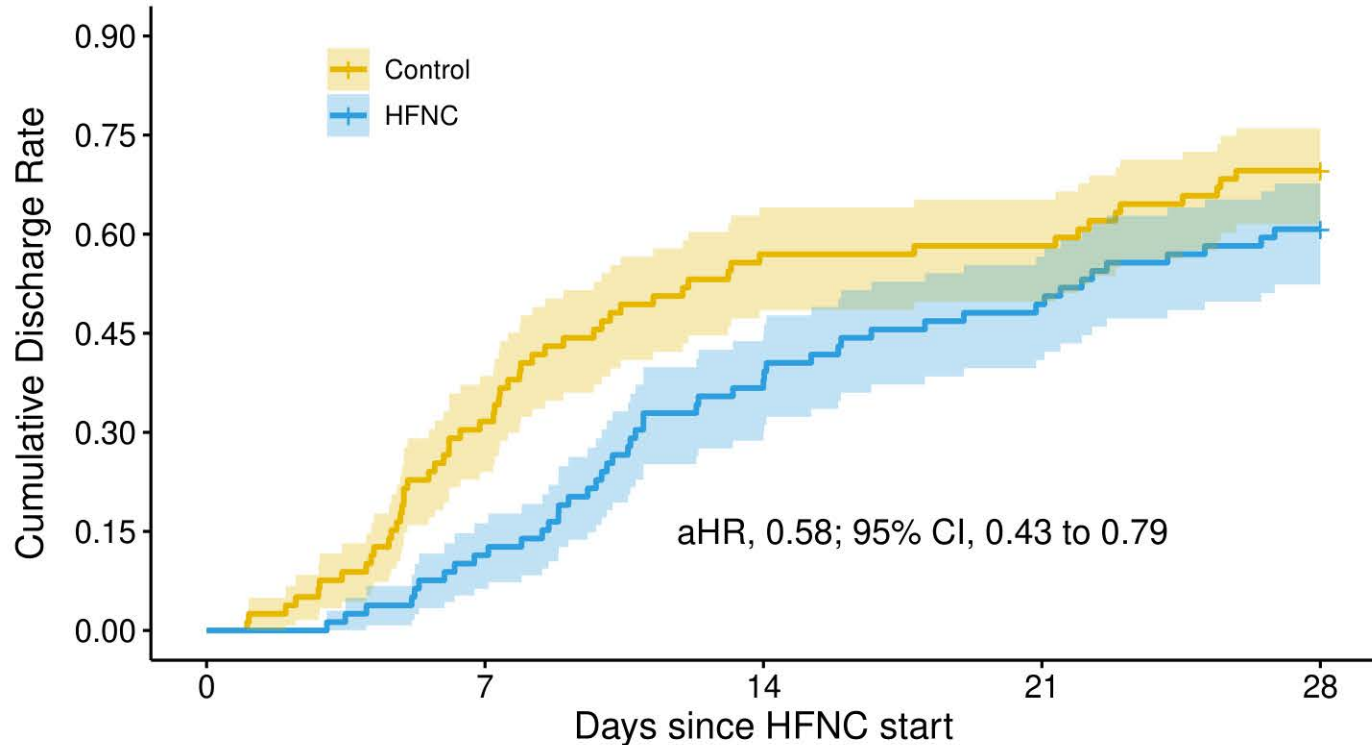
Days since HFNC start

HIGH-FLOW NASAL CANNULA IN COVID-19 PNEUMONIA

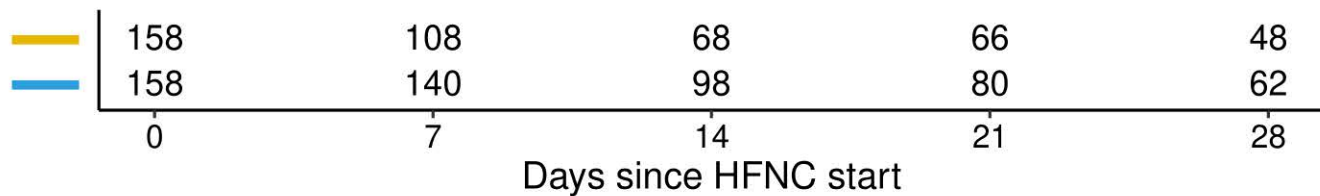
Supplemental Figure 3: Time to death and discharge with inclusion of patients who died within 24 hours

To assess for selection or other biases, the time to death analysis was re-run without excluding patients who died within 24 hours of time of matching.

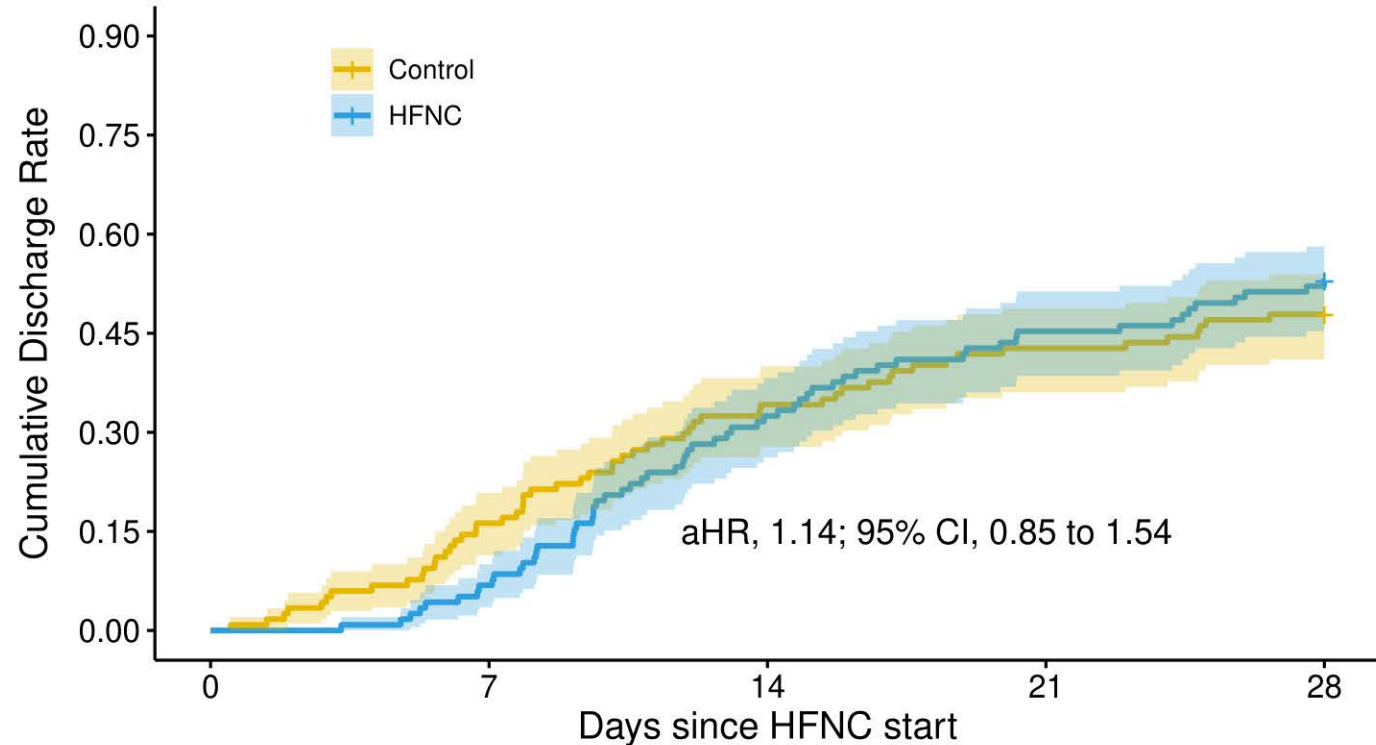
A. Academic hospitals



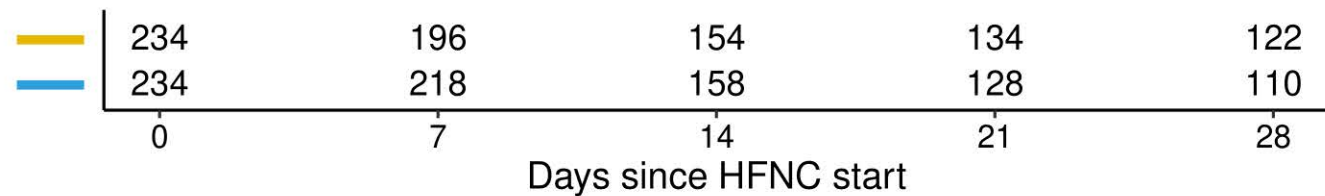
Number at risk



B. Community hospitals



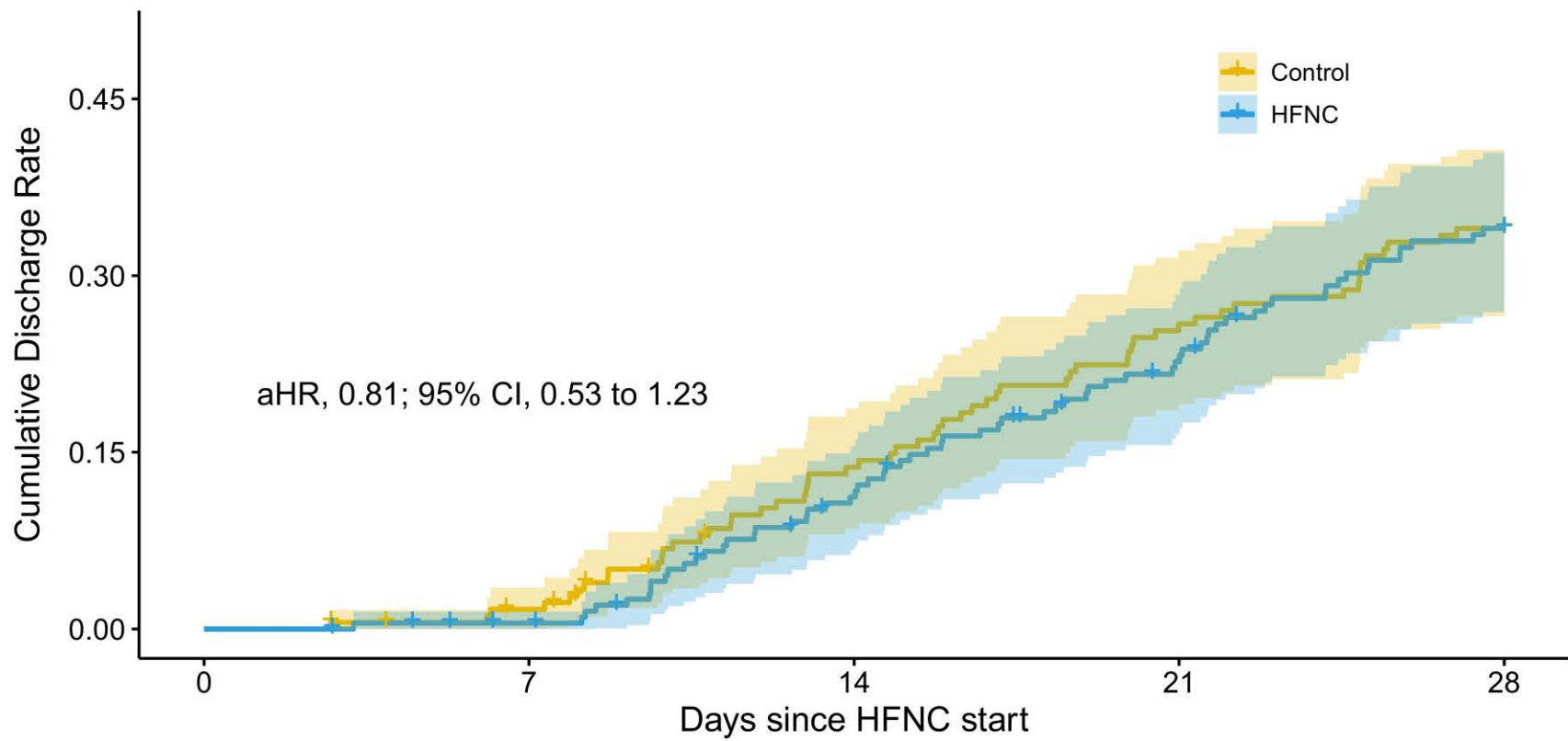
Number at risk



HIGH-FLOW NASAL CANNULA IN COVID-19 PNEUMONIA

Supplemental Figure 4: Time to discharge stratified by hospital type

The Johns Hopkins Health System (JHHS) includes two academic hospitals (Johns Hopkins Hospital and Bayview Medical Center) and three community hospitals (Howard County General Hospital, Suburban Hospital, Sibley Memorial Hospital). aHR = adjusted hazard ratio, CI = confidence interval, HFNC = High-flow nasal cannula.



Number at risk

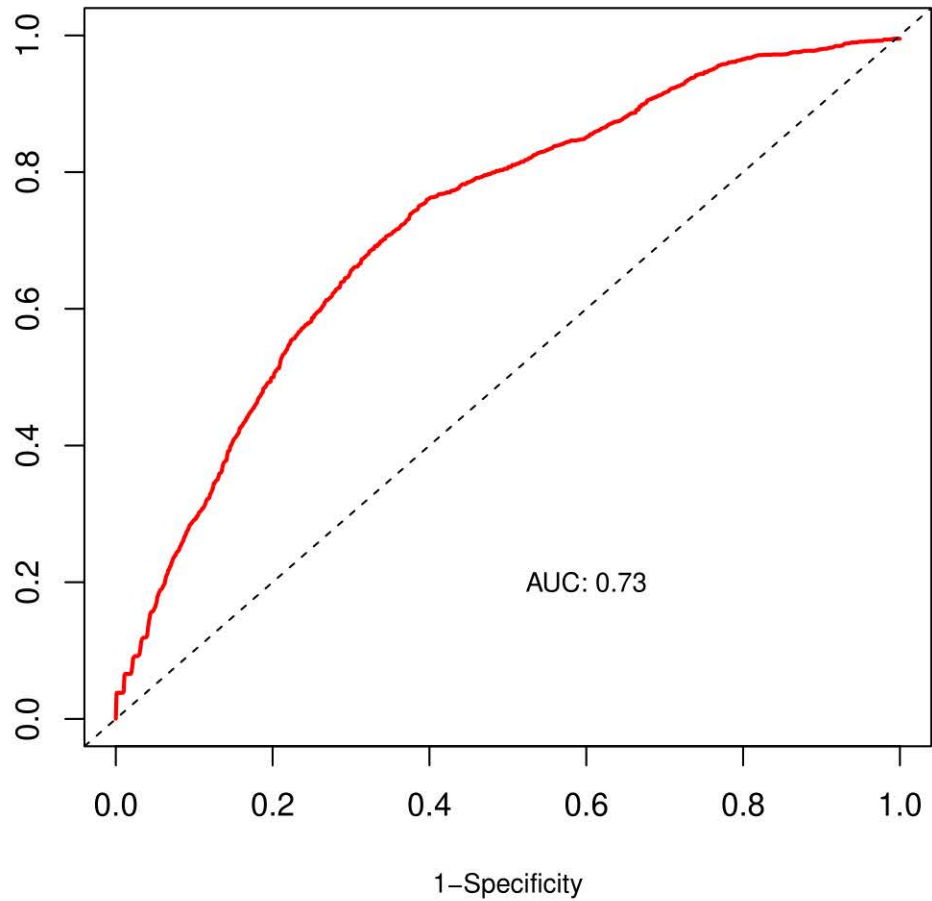
Days since HFNC start	0	7	14	21	28
Control (Yellow)	181	175	149	128	114
HFNC (Blue)	203	198	172	145	122

HIGH-FLOW NASAL CANNULA IN COVID-19 PNEUMONIA

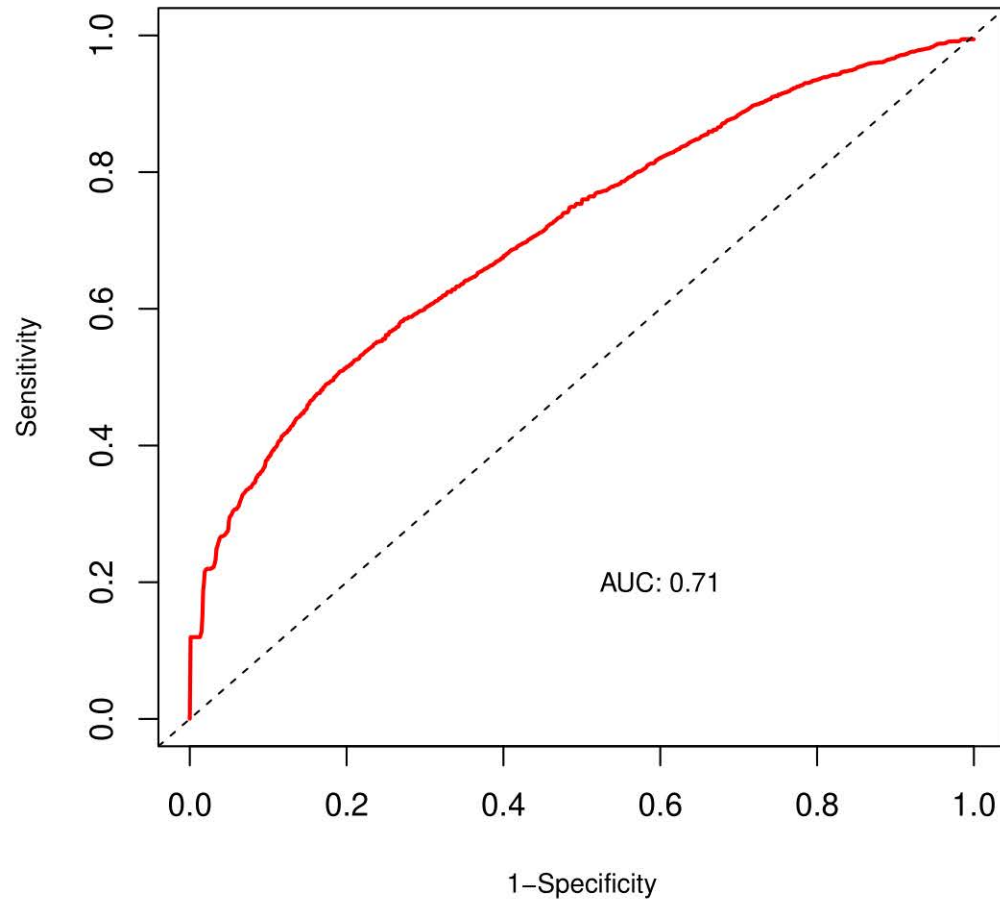
Supplemental Figure 5: Time to discharge analysis of patients who progressed to invasive mechanical ventilation (IMV)

To explore the effect of HFNC in patients who progressed to IMV, a hazard ratio for time to discharge was calculated for these patients compared to their matched controls. aHR = adjusted hazard ratio, CI = confidence interval, HFNC = High-flow nasal cannula, IMV = invasive mechanical ventilation.

A. 1-day prediction ROC curve



B. 7-day prediction ROC curve

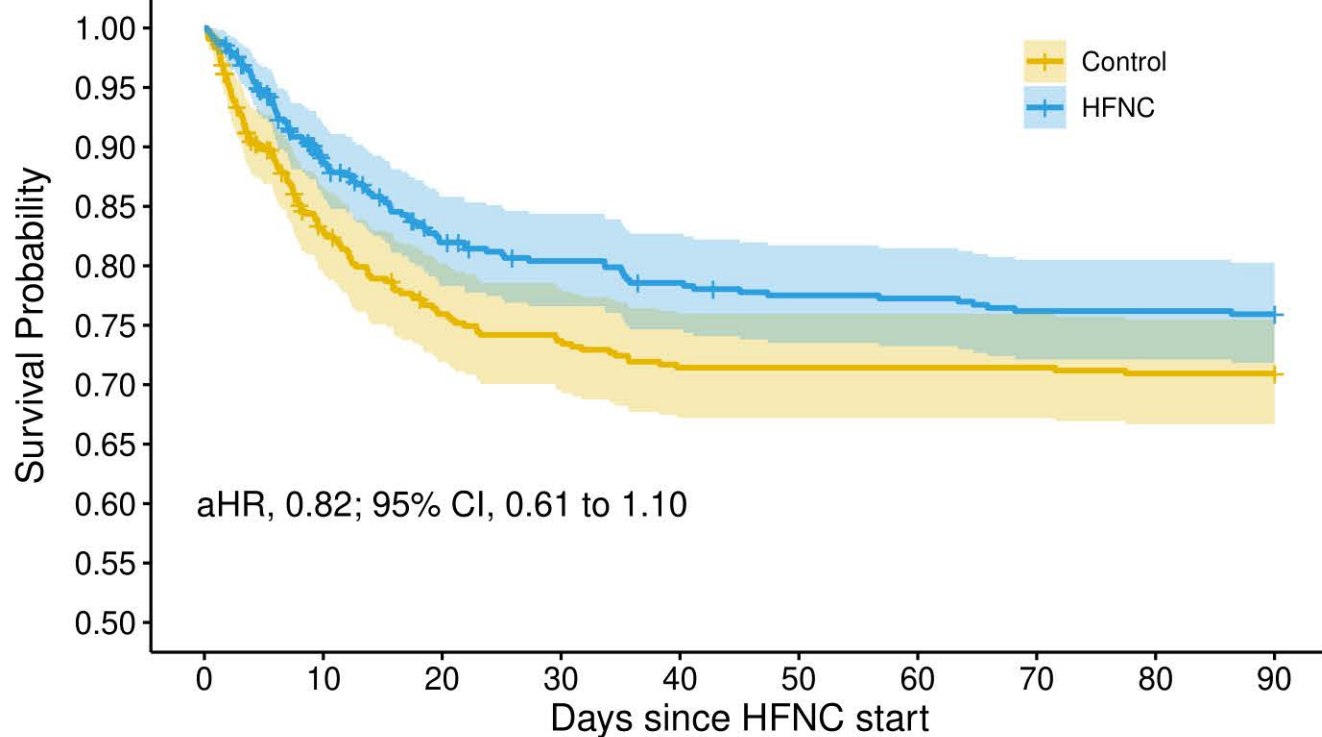


HIGH-FLOW NASAL CANNULA IN COVID-19 PNEUMONIA

Supplemental Figure 6: Receiver operating characteristic (ROC) curves of model predicting ventilation or death.

ROC curves for a model predicting ventilation or death using ROX index as well as demographic, clinical, and laboratory variables. AUC = area under curve, ROC = receiving operator characteristic.

A. Survival curve for all matched patients

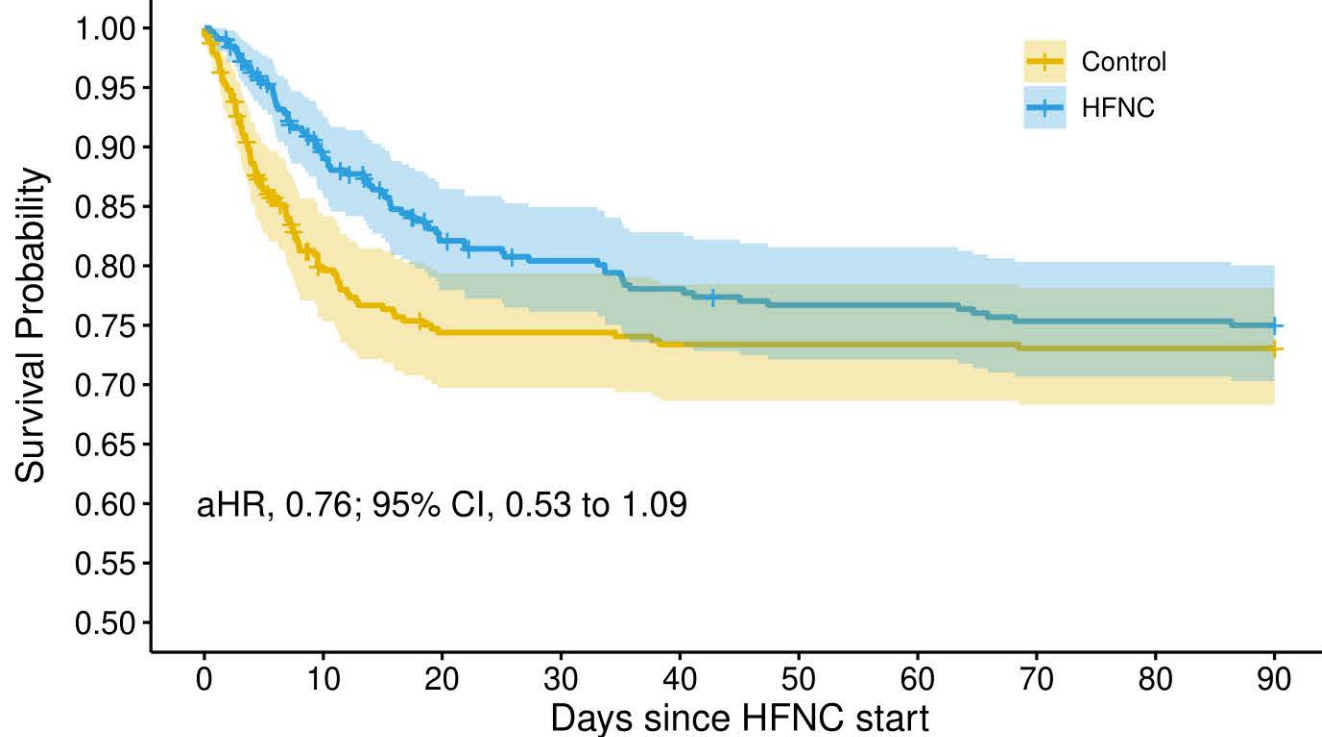


Number at risk

Control	423	335	304	295	286	286	286	286	284	284
HFNC	423	354	317	307	299	294	293	289	289	288
	0	10	20	30	40	50	60	70	80	90

Days since HFNC start

B. Survival curve excluding patients intubated within 6 hours of admission



Number at risk

Control	327	243	226	226	223	223	223	222	222	222
HFNC	327	277	246	238	231	226	226	222	222	221
	0	10	20	30	40	50	60	70	80	90

Days since HFNC start

HIGH-FLOW NASAL CANNULA IN COVID-19 PNEUMONIA

Supplemental Figure 7: Time to death in patients up to 90 days

To explore the effect of including the small number of deaths that occurred past 28 days, the primary analysis was re-run with censoring at 90 days. For the purpose of this analysis, the patients who were discharged before 90 days were right censored at 90 days. However, we did not have a way to verify that there were no deaths after discharge.