Supplementary Material*

Al-Samkari H, Gupta S, Karp Leaf R, et al. Thrombosis, Bleeding, and the Observational Effect of Early Therapeutic Anticoagulation on Survival in Critically Ill Patients With COVID-19. Ann Intern Med. 2021. [Epub ahead of print]. doi:10.7326/M20-6739

Supplement. **Supplementary Materials**

* This supplementary material was provided by the authors to give readers further details on their article. The material was reviewed but not copyedited.

STOP-COVID INVESTIGATORS

Unless also in the author byline, the investigators listed below contributed to the manuscript but did not author it.

Baylor College of Medicine: Carl P. Walther*, Samaya J. Anumudu

Baylor University Medical Center: Justin Arunthamakun*, Kathleen F. Kopecky, Gregory P. Milligan, Peter A. McCullough, Thuy-Duyen Nguyen

Beth Israel Deaconess Medical Center: Shahzad Shaefi*, Megan L. Krajewski, Sidharth Shankar, Ameeka Pannu, Juan D. Valencia, Kenneth A. Bauer

Boston Medical Center: Sushrut S. Waikar*, Zoe A. Kibbelaar

Cook County Health: Ambarish M. Athavale*, Peter Hart, Shristi Upadhyay, Ishaan Vohra, Ajiboye Oyintayo

Cooper University Health Care: Adam Green*, Jean-Sebastien Rachoin, Christa A. Schorr, Lisa Shea

Duke University Medical Center: Daniel L. Edmonston*, Christopher L. Mosher

Hackensack Meridian Health Mountainside Medical Center: Alexandre M. Shehata*, Zaza Cohen, Valerie Allusson, Gabriela Bambrick-Santoyo, Noor ul aain Bhatti, Bijal Mehta, Aquino Williams

Hackensack Meridian Health Hackensack University Medical Center: Samantha K. Brenner*, Patricia Walters, Ronaldo C. Go, Keith M. Rose

Harvard T.H. Chan School of Public Health: Miguel A. Hernán

Harvard University: Amy M. Zhou, Ethan C. Kim, Rebecca Lisk

Icahn School of Medicine at Mount Sinai: Lili Chan*, Kusum S. Mathews*, Steven G. Coca, Deena R. Altman, Aparna Saha, Howard Soh, Huei Hsun Wen, Sonali Bose, Emily A. Leven, Jing G. Wang, Gohar Mosoyan, Pattharawin Pattharanitima, Emily J. Gallagher

Indiana University School of Medicine/Indiana University Health: Allon N. Friedman*, John Guirguis, Rajat Kapoor, Christopher Meshberger, Katherine J. Kelly

Johns Hopkins Hospital: Chirag R. Parikh*, Brian T. Garibaldi, Celia P. Corona-Villalobos, Yumeng Wen, Steven Menez, Rubab F. Malik, Carmen Elena Cervantes, Samir C. Gautam

Kings County Hospital Center: Mary C. Mallappallil*, Jie Ouyang, Sabu John, Ernie Yap, Yohannes Melaku, Ibrahim Mohamed, Siddhartha Bajracharya, Isha Puri, Mariah Thaxton, Jyotsna Bhattacharya, John Wagner, Leon Boudourakis

Loma Linda University: H. Bryant Nguyen*, Afshin Ahoubim

Mayo Clinic, Arizona: Leslie F. Thomas*, Dheeraj Reddy Sirganagari

Mayo Clinic, Florida: Pramod K. Guru*

Medical College of Wisconsin: Yan Zhou,* Paul A. Bergl, Jesus Rodriguez, Jatan A. Shah, Mrigank S. Gupta

MedStar Georgetown University Hospital: Princy N. Kumar*, Deepa G. Lazarous, Seble G. Kassaye

Montefiore Medical Center/Albert Einstein College of Medicine: Michal L. Melamed*, Tanya S. Johns. Ryan Mocerino, Kalyan Prudhvi, Denzel Zhu, Rebecca V. Levy, Yorg Azzi, Molly Fisher, Milagros Yunes, Kaltrina Sedaliu, Ladan Golestaneh, Maureen Brogan, Jyotsana Thakkar, Neelja Kumar, Michael J. Ross, Michael Chang

New York-Presbyterian Queens Hospital: Ritesh Raichoudhury*, Akshay Athreya, Mohamed Farag

New York-Presbyterian/Weill Cornell Medical Center: Edward J. Schenck*, Soo Jung Cho, Maria Plataki, Sergio L. Alvarez-Mulett, Luis G. Gomez-Escobar, Di Pan, Stefi Lee, Jamuna Krishnan, William Whalen

New York University Langone Hospital: David Charytan*, Ashley Macina

Northwestern Memorial Hospital: Northwestern University Feinberg School of Medicine - Anand Srivastava*, Alexander S. Leidner, Carlos Martinez, Jacqueline M. Kruser, Richard G. Wunderink, Alexander J. Hodakowski

Ochsner Medical Center: Juan Carlos Q. Velez*, Eboni G. Price-Haywood, Luis A. Matute-Trochez, Anna E. Hasty, Muner MB. Mohamed

Oregon Health and Science University Hospital: Rupali S. Avasare*, David Zonies*

Partners Healthcare: Brigham and Women's Hospital, Brigham and Women's Faulkner Hospital, Massachusetts General Hospital, and Newton Wellesley Hospital – David E. Leaf*, Shruti Gupta*, Hanny Al-Samkari, Rebecca Karp Leaf, Rachel Rosovsky, Meghan E. Sise, Erik T. Newman, Samah Abu Omar, Kapil K. Pokharel, Shreyak Sharma, Harkarandeep Singh, Simon Correa, Tanveer Shaukat, Omer Kamal, Wei Wang, Meghan Lee, Ian A. Strohbehn, Jiahua Li, Ariel L. Mueller

ProMedica Health System: Roberta E. Redfern,* Nicholas S. Cairl, Gabriel Naimy, Abeer Abu-Saif, Danyell Hall, Laura Bickley

Renown Health: Chris Rowan*, Farah Madhani-Lovely*

Rush University Medical Center: Vasil Peev*, Jochen Reiser, John J. Byun, Andrew Vissing, Esha M. Kapania, Zoe Post, Nilam P. Patel, Joy-Marie Hermes

Rutgers/New Jersey Medical School: Anne K. Sutherland*, Amee Patrawalla, Diana G. Finkel, Barbara A. Danek, Sowminya Arikapudi, Jeffrey M. Paer, Peter Cangialosi, Mark Liotta

Rutgers/Robert Wood Johnson Medical School: Jared Radbel*, Sonika Puri, Jag Sunderram, Matthew T. Scharf, Ayesha Ahmed, Ilya Berim, Jayanth S. Vatson, George Karp

Stanford Healthcare: Stanford University School of Medicine – Shuchi Anand*, Joseph E. Levitt, Pablo Garcia

Temple University Hospital: Suzanne M. Boyle*, Rui Song

Thomas Jefferson University Hospital: Jingjing Zhang*, Sang Hoon Woo, Xiaoying Deng, Goni Katz-Greenberg

Tulane Medical Center: Moh'd A. Sharshir*, Vadym V. Rusnak

United Health Services Hospitals: Muhammad Imran Ali

University of Colorado Anschutz Medical Campus: Anip Bansal*, Amber S. Podoll, Michel Chonchol, Sunita Sharma, Ellen L. Burnham

University Hospitals Cleveland Medical Center: Arash Rashidi*, Rana Hejal

University of Alabama-Birmingham Hospital: Eric Judd*, Laura Latta, Ashita Tolwani

University of California-Davis Medical Center: Timothy E. Albertson*, Jason Y. Adams

University of California-Los Angeles Medical Center: Ronald Reagan-UCLA Medical Center - Steven Y. Chang*, Rebecca M. Beutler; Santa Monica-UCLA Medical Center – Carl E. Schulze

University of California-San Diego Medical Center: Etienne Macedo*, Harin Rhee

University of California-San Francisco Medical Center: Kathleen D. Liu*, Vasantha K. Jotwani

University of Chicago Medical Center: Jay L. Koyner*

University of Florida Health-Gainesville: Chintan V. Shah*

University of Florida-Health-Jacksonville: Vishal Jaikaransingh*

University of Illinois Hospital and Health Sciences System: Stephanie M. Toth-Manikowski*, Min J. Joo*, James P. Lash

University of Kentucky Medical Center: Javier A. Neyra*, Nourhan Chaaban, Madona Elias, Yahya Ahmad

University Medical Center of Southern Nevada: Rajany Dy*, Alfredo Iardino, Elizabeth H. Au, Jill H. Sharma

University of Miami Health System: Marie Anne Sosa*, Sabrina Taldone, Gabriel Contreras, David De La Zerda, Hayley B. Gershengorn, Alessia Fornoni

University of Michigan: Salim S. Hayek*, Pennelope Blakely, Hanna Berlin, Tariq U. Azam, Husam Shadid, Michael Pan, Patrick O' Hayer, Chelsea Meloche, Rafey Feroze, Kishan J. Padalia, Jeff Leya, John P. Donnelly, Andrew J. Admon

University of North Carolina School of Medicine: Jennifer E. Flythe*, Matthew J. Tugman, Emily H. Chang

University of Oklahoma Health Sciences Center: Brent R. Brown*

University of Pennsylvania Health System: Amanda K. Leonberg-Yoo*, Ryan C. Spiardi, Todd A. Miano, Meaghan S. Roche, Charles R. Vasquez

University of Pittsburgh Medical Center: Amar D. Bansal*, Natalie C. Ernecoff, Sanjana Kapoor, Siddharth Verma, Huiwen Chen

University of Tennessee Health Science Center and Memphis VA Medical Center/Methodist University Hospital – Csaba P. Kovesdy*, Miklos Z. Molnar*, Ambreen Azhar

University of Texas Southwestern Medical Center and Parkland Health and Hospital System: S. Susan Hedayati*, Mridula V. Nadamuni, Shani Shastri, Duwayne L. Willett

University of Vermont Larner College of Medicine: Samuel A.P. Short

University of Virginia Health System: Amanda D. Renaghan*, Kyle B. Enfield

University of Washington Medical Center: Pavan K. Bhatraju*, A. Bilal Malik

Vanderbilt University Medical Center: Matthew W. Semler

Washington University in St. Louis/Barnes Jewish Hospital: Anitha Vijayan*, Christina Mariyam Joy, Tingting Li, Seth Goldberg, Patricia F. Kao

Wellforce Health System: Lowell General Hospital **-** Greg L. Schumaker*, Tufts Medical Center - Nitender Goyal*, Anthony J. Faugno, Greg L. Schumaker, Caroline M. Hsu, Asma Tariq, Leah Meyer, Ravi K. Kshirsagar, Daniel E. Weiner

Westchester Medical Center: Marta Christov*, Jennifer Griffiths, Sanjeev Gupta, Aromma Kapoor, Savneek Chugh

Yale School of Medicine: Perry Wilson,* Tanima Arora, Ugochukwu Ugwuowo

*Site Principal Investigator

SUPPLEMENTAL METHODS

Data Collection and Validation

Data were collected using REDCap, a secure, HIPAA-compliant, web-based application. Wherever possible, data were captured using checkboxes rather manual entry to minimize keystroke errors. For data that required keystroke entry (e.g., laboratory values), we implemented validation ranges to flag potential errors in real-time. For example, blank values for required fields, field validation errors (incorrect data type), field validation errors (out of range), outliers for numerical fields, multiple choice fields with invalid values (e.g., if a user selected "none of the above" while also selecting one of the other choices), and errors in dates were all flagged in real time using REDCap's Data Quality module. Outliers for numerical fields were also validated manually by confirming the values with the data collector. Finally, after collection, all data were again manually reviewed, and values that appeared incongruent or out of range were manually validated by confirming the accuracy of the data with the collaborator who entered it.

Multivariable Modeling of Predictors of VTE

We performed multivariable logistic regression modeling to estimate the association between prespecified variables of interest and radiographically-confirmed venous thromboembolism (VTE). The following variables were included in the multivariable model based on clinical knowledge and biologic plausibility:

1. Age (years): 18-39, 40-59, 60-79, ≥80
2. Male sex
3. Body mass index (kg/m^2): <30, 30-39.9, ≥40
4. Active malignancy
5. Current smoker
6. Shock on ICU Day 1, defined as the requirement for ≥2 vasopressors
7. Respiratory failure (requirement for mechanical ventilation) on ICU day 1
8. Leukocyte count (per mm^3) on ICU day 1: <11,000, ≥11,000 per mm^3
9. Platelet count ($\times 10^9$ cells/L) on ICU day 1: <350, ≥350 $\times 10^9$ cells/L
10. Receipt of therapeutic anticoagulation on ICU day 1
11. Receipt of aspirin on ICU day 1
12. D-dimer (ng/mL) on ICU day 1: ≤1,000, 1,001-2,500, 2,501-10,000, >10,000

The primary outcome was radiographically-confirmed VTE (deep vein thrombosis or pulmonary embolism) in the 14 days following ICU admission. Missing data were multiply imputed with five datasets, and results were pooled using Rubin's rules.[1]

Target Trial Specification

We sought to emulate a hypothetical randomized clinical trial in which eligible patients were adults (≥18 years old) with laboratory-confirmed COVID-19 who were admitted to a participating intensive care unit (ICU) between March 4 and April 11, 2020. We excluded patients if they were receiving anticoagulation prior to hospitalization, or if they had any of the following within the first two days of ICU admission: confirmed or suspected VTE; extracorporeal membrane oxygenation; major bleeding event; or a platelet count less than 50×10^9 cells/L.

Patients were categorized according to receipt or no receipt of therapeutic anticoagulation within the first two days of ICU admission. ICU day 1 was defined as the 24-hour period spanning from midnight to midnight on the day of ICU admission. Day 2 was defined as the subsequent 24-hour period following ICU day 1. Patients who initiated therapeutic anticoagulation after day 2

were categorized in the control group, in keeping with an intention-to-treat approach. Patients were followed until the first of hospital discharge, death, or May 8th, 2020 – the date on which the study database for the current analysis was locked. Thus, all patients who remained hospitalized at the time of analysis had a minimum of 28 days of follow-up.

The primary analysis compares the survival among patients who received or did not receive therapeutic anticoagulation in the first two days of ICU admission. Survival time was defined as the interval from ICU admission to death, censored at hospital discharge or the end of follow-up, whichever occurred first. Hazard ratios and 95% confidence intervals (CIs) were estimated using a Cox model.

Inverse probability weighting (IPW)
We adjusted for confounding using IPW. We fit a logistic regression model with initiation of therapeutic anticoagulation as the outcome conditional on the covariates listed below. These covariates were prespecified based on clinical judgment, as they were thought to be potentially associated with a clinician's decision to initiate treatment with therapeutic anticoagulation and with survival. We used these predicted probabilities to calculate stabilized inverse probability weights.[2] We used a robust (sandwich) variance estimator to account for potential replications of patients induced by IPW, which results in conservative 95% CIs. We evaluated standardized differences across each measured covariate before and after applying the weighting (**Figure 5**).

Sensitivity analyses
We conducted five sensitivity analyses of the target trial emulation. First, we included the covariates above in an unweighted Cox model. Second, to eliminate the potential for immortal time bias (20, 21), we categorized eligible individuals into either the early therapeutic anticoagulation group or no early therapeutic anticoagulation group on ICU day 1, and we repeated the process for eligible individuals on ICU day 2. Our final estimates were obtained by pooling the data from the nested target trials on ICU days 1 and 2, using inverse probability weighting as described herein. Third, we repeated the primary target trial, but extended the exposure period for initiation of therapeutic anticoagulation from the first 2 days to the first 3 days following ICU admission. Fourth, we stratified the Cox model by site. Fifth, rather than censoring patients at hospital discharge, we kept them in the risk set until May 8, 2020, the date of last follow-up.

Subgroup analyses
We used similar methods as the primary analysis above to estimate the effect of early therapeutic anticoagulation on survival across the following prespecified subgroups: age (≤60 vs. >60 years); sex; body mass index (<40 vs. ≥40 kg/m^2); days from symptom onset to ICU admission (≤3 vs. >3); receipt of invasive mechanical ventilation, shock, and PaO_2:FiO_2 ratio (<100, 100-199, and ≥200 or not mechanically ventilated) on ICU day 1; D-dimer level on ICU days 1 or 2 (≤1000, 1001-2500, and >2500 ng/mL); and number of pre-COVID ICU beds (<50, 50-99, and ≥100).

Covariates included in IPW modeling

<u>Baseline covariates</u>
Age: 18-39; 40-59; 60-79; ≥80
Male sex
Race: white versus non-white (including other/unknown)
Ethnicity: non-Hispanic versus Hispanic/Unknown
Body mass index (kg/m^2): <30; 30-39.9; ≥40; missing

Hypertension
Diabetes mellitus
Atrial fibrillation/flutter
Coronary artery disease
Congestive heart failure
Current smoker
Active malignancy
Days from symptom onset to ICU admission: 0 to 3; >3

Severity-of-illness covariates assessed on ICU admission

PaO_2:FiO_2 (P/F) ratio on ICU day 1 as follows: not ventilated; ventilated and P/F ratio≥200; ventilated and P/F ratio <200; ventilated and P/F ratio missing
Shock on ICU day 1: ≥2 vasopressors versus <2 vasopressors
Renal, liver, and coagulation components of the Sequential Organ Failure Assessment (SOFA) score on ICU day 1:[3]

	Categories		
	0[a]	**1**	**2[b]**
SOFA Renal	Cr<1.2 and UOP≥500	Cr 1.2-1.9 and UOP≥500	Cr ≥2 or UOP<500[c] or acute RRT or ESRD
SOFA Liver (Bilirubin, µmol/L [mg/dl])	<20.5 (<1.2)	20.5-34.1 (1.2-1.9)	≥34.2 (≥2)
SOFA Coagulation (Platelets, $\times 10^9$ cells/L)	≥150	100-149	≤99

[a]Missing data were categorized as 0.
[b]Renal, liver, and coagulation SOFA scores of 2, 3, or 4 were binned due to low frequency of events in categories "3" and "4".
[c]If the UOP was missing, the category was assigned according to the Cr
Abbreviations: Cr, creatinine (mg/dl); ESRD, end stage renal disease; RRT, renal replacement therapy; UOP, urine output.

Severity-of-illness covariates assessed on ICU days 1 and 2

Inflammation on ICU days 1 or 2. Three mutually exclusive categories were created: inflamed, non-inflamed, or missing. Inflamed was defined as at least one of the following on either ICU day 1 or 2: C-reactive protein >100 mg/L, D-dimer >1.000 mg/L, or Ferritin >1,000 µg/L. Non-inflamed was defined as at least one value that was below the threshold on either ICU day 1 or 2 and no value that was above the threshold for the above parameters. Missing was defined as all three values being missing on both ICU days 1 and 2

Concurrent therapies (each assessed individually) received on either ICU days 1 or 2

Aspirin; prone positioning; neuromuscular blockade.

Missing data

The renal, liver, and coagulation components of the SOFA score were categorized as "0" if missing.[4-6] Otherwise, missing data were not imputed. Rather, we created a separate missing category for each covariate that had missing data, since data may not have been missing at random.

SUPPLEMENTAL TABLES

Table 1. List of Participating Sites

Northeast
Beth Israel Deaconess Medical Center
Brigham and Women's Faulkner Hospital
Brigham and Women's Hospital
Cooper University Health Care
Hackensack Meridian Health Hackensack University Medical Center
Hackensack Mountainside Hospital
Johns Hopkins Hospital
Kings County Hospital Center
Lowell General Hospital
Massachusetts General Hospital
MedStar Georgetown University Hospital
Montefiore Medical Center
Mount Sinai
Newton Wellesley Hospital
New York-Presbyterian Queens Hospital
New York-Presbyterian/Weill Cornell Medical Center
New York University Langone Hospital
Rutgers/New Jersey Medical School
Rutgers/Robert Wood Johnson Medical School
Temple University Hospital
Thomas Jefferson University Hospital
Tufts Medical Center
United Health Services Hospitals
University of Pennsylvania Health System
University of Pittsburgh Medical Center
Westchester Medical Center
Yale University Medical Center
South
Baylor College of Medicine, Houston
Baylor University Medical Center/Baylor Scott White and Health
Duke University Medical Center
Mayo Clinic, Florida
Memphis VA Medical Center
Methodist University Hospital
Ochsner Medical Center
Tulane Medical Center
University of Alabama-Birmingham Hospital
University of Florida Health-Gainesville
University of Florida Health-Jacksonville
University of Miami Health System
University of North Carolina Hospitals
University of Texas Southwestern Medical Center
University of Virginia Health System
Midwest
Barnes-Jewish Hospital
Cook County Health
Froedtert Hospital
Indiana University Health Methodist Hospital
Northwestern Memorial Hospital
Promedica Health System
Rush University Medical Center
University Hospitals Cleveland Medical Center
University of Chicago Medical Center
University of Illinois Hospital and Health Sciences System
University of Kentucky Hospital
University of Michigan Hospital
University of Oklahoma Health Sciences Center
West
Loma Linda University Medical Center
Mayo Clinic, Arizona
Oregon Health and Science University Hospital
Renown Health
Stanford Healthcare
University of California-Davis Medical Center
University of California-Los Angeles Medical Center
University of California-San Diego Medical Center
University of California-San Francisco Medical Center
UCHealth University of Colorado
University Medical Center of Southern Nevada
University of Washington Medical Center

Table 2. Definitions of Baseline Characteristics, Comorbidities, Treatments, and Outcomes

Baseline Characteristics	
Home medications	Medications that the patient was taking at home within 1 week prior to admission. Does not include those started at an outside hospital if the patient was transferred.
Anticoagulation	Oral anticoagulation or therapeutic parenteral anticoagulation, not including anti-platelet agents such as aspirin or clopidogrel
Coexisting Conditions	
Asthma	Per chart review
Atrial fibrillation/flutter	Per chart review
Active malignancy	Per chart review; active malignancy (other than non-melanoma skin cancer) treated in the past year. Defined as cancer of the lung, breast, colorectal, prostate, gastric, pancreatic, melanoma, ovarian, brain, or other
Chronic kidney disease	Baseline eGFR< 60 on at least two consecutive values at least 12 weeks apart prior to hospital admission. If not available, defined as per chart review
Chronic liver disease	Cirrhosis, alcohol-related liver disease, nonalcoholic fatty liver disease, autoimmune hepatitis, hepatitis B or hepatitis C, primary biliary cirrhosis, or other
Chronic obstructive pulmonary disease	Per chart review
Congestive heart failure	Per chart review; heart failure with preserved versus reduced ejection fraction
Coronary artery disease	Per chart review; any history of angina, myocardial infarction, or coronary artery bypass graft surgery
Diabetes mellitus	Per chart review; insulin versus non-insulin dependent
End stage renal disease	Per chart review; on hemodialysis or peritoneal dialysis
History of alcohol abuse	Per chart review
HIV/AIDS	Per chart review
Homelessness	Per chart review
Hypertension	Per chart review
Smoking	Per chart review; does not include vaping or smoking of non-tobacco products. Non-smoker, former smoker, current smoker
Longitudinal Treatments[a]	
Extracorporeal membrane oxygenation	Veno-venous, veno-arterial, or veno-arterial-venous
Mechanical ventilation	Invasive mechanical ventilation
Renal replacement therapy	CRRT, intermittent hemodialysis, peritoneal dialysis, other
PaO2[b]	Lowest PaO2 available during each 24 hour day (midnight to midnight)
FiO2[b]	FiO2 corresponding to the lowest PaO2
PEEP[b]	Highest PEEP available during each 24-hour day (midnight to midnight)
Vasopressors	Maximum number of vasopressors required each day
Outcomes[a]	
Acute kidney injury[c]	Doubling of serum creatinine from baseline or need for renal replacement therapy (RRT), corresponding with stages 2 and 3 of the Kidney Disease: Improving Global Outcomes Criteria.[1] Baseline serum creatinine was defined as the lowest value from within 365 to 7 days prior to hospital admission. If unavailable, the hospital admission value was used as the baseline.
Acute liver injury	Modified version of the CTCAE criteria[2]: bilirubin >51.3 µmol/L (3.0 mg/dl) *and* either AST>100 units per liter or ALT>100 units per liter
Coagulopathy	INR>2 or aPTT>58 seconds (which is approximately twice the central value of most aPTT reference ranges) in the absence of oral anticoagulation or therapeutic parenteral anticoagulation
Congestive heart failure (new onset)	Per chart review; includes both heart failure with preserved and reduced ejection fraction
Disseminated intravascular coagulation	Per chart review (diagnosis assigned by treating physician)
Heparin-induced thrombocytopenia	Per chart review
Major bleed	Per chart review; bleeding in a critical area or organ (e.g., intracranial, retroperitoneal, pericardial, or intramuscular bleeding with compartment syndrome) or bleeding requiring a procedural intervention (e.g., EGD or IR embolization). Requirement for red cell transfusion alone did *not* result in the bleeding event qualifying as a major bleed. Bleeds for which a procedural intervention was clearly indicated but which could not be done (due to COVID status or critical illness) were included.
Respiratory failure	Requirement for invasive mechanical ventilation
Shock	Requirement for 2 or more vasopressors
Radiographically-confirmed venous thromboembolism	Per chart review; deep vein thrombosis confirmed on ultrasound or cross-sectional imaging or pulmonary embolism confirmed on contrast-enhanced CT scan or ventilation/perfusion scan. Does not include superficial venous thrombosis.

Ischemic stroke	Per chart review; does not include hemorrhagic stroke, which is classified as a major bleeding event

Abbreviations: ALT, alanine transaminase; aPTT, activated partial thromboplastin time; AST, aspartate transaminase; COVID-19, coronavirus disease-2019; CRRT, continuous renal replacement therapy, CT, computed tomography; CTCAE, Common Terminology Criteria for Adverse Events; DVT, deep vein thrombosis; EGD, esophagogastroduodenoscopy; eGFR, estimated glomerular filtration rate; FiO2, fraction of inspired oxygen; HIV/AIDS, human immunodeficiency virus/acquired immunodeficiency syndrome; IR, interventional radiology; LVAD, left ventricular assist device; PaO2, partial pressure of oxygen; PE, pulmonary embolism; PEEP, positive end-expiratory pressure.

[a]Longitudinal treatments and outcomes were recorded daily for the first 14 days following admission to the ICU. If multiple values were present, the lowest PaO_2 available, along with the corresponding FiO_2 at the time, was recorded, while the highest PEEP on each day was recorded. If the patient had an outcome, the date of the outcome was recorded.
[b]Only applies to patients on mechanical ventilation with an arterial blood gas available.
[c]Excludes patients with end stage renal disease.

References in Table 2

[1]Kidney Disease; Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO clinical practice guideline for acute kidney injury. *Kidney Int Suppl 2*, 2012: 1-138.
[2]US Department of Health and Human Services. Common Terminology Criteria for Adverse Events (CTCAE). Bethesda, MD: National Institute of Health, National Cancer Institute, 2017.

Table 3. Complete List of Patient Characteristics at Baseline.

Characteristic	All Patients (N=3239)	Confirmed VTE (N=204)	No Confirmed VTE (N=3035)	Major Bleeding (N=90)	No Major Bleeding (N=3149)
Demographics					
Age (yr)					
Median (IQR)	61.0 (52.5-71.0)	60.0 (50.0-67.3)	62.0 (52-71)	62.5 (55.3-73.8)	62.0 (51.0-71.0)
Distribution – no. (%)					
18–39	278 (8.6)	16 (7.8)	262 (8.6)	5 (5.6)	273 (8.7)
40–49	407 (12.6)	32 (15.7)	375 (12.4)	6 (6.7)	401 (12.7)
50–59	691 (21.3)	51 (25.0)	640 (21.1)	23 (25.6)	668 (21.2)
60-69	916 (28.3)	66 (32.4)	850 (28.0)	23 (25.6)	893 (28.4)
70-79	648 (20.0)	30 (14.7)	618 (20.4)	23 (25.6)	625 (19.9)
≥80	299 (9.2)	9 (4.4)	290 (9.6)	10 (11.1)	289 (9.2)
Male sex – no. (%)	2088 (64.5)	149 (73.0)	1939 (63.9)	64 (71.1)	2024 (64.3)
Race – no. (%)					
White	1194 (36.9)	66 (32.4)	1128 (37.2)	33 (36.7)	1161 (26.9)
Black	1015 (31.3)	86 (42.2)	929 (30.6)	28 (31.1)	987 (31.3)
Asian	198 (6.1)	5 (2.5)	193 (6.4)	8 (8.9)	190 (6.0)
Other	832 (25.7)	47 (23.0)	785 (25.9)	21 (23.3)	811 (25.8)
Hispanic – no. (%)	663 (20.5)	37 (18.1)	626 (20.6)	14 (15.6)	649 (20.6)
Body mass index – median (IQR)	30.3 (25.5-36.0)	30.9 (26.9-36.7)	30.3 (26.5-35.9)	28.4 (25.2-32.2)	30.4 (26.6-36.2)
Pregnant – no. (%)	20 (0.6)	1 (0.5)	19 (0.6)	1 (1.1)	19 (0.6)
Homeless – no. (%)	23 (0.7)	1 (0.5)	22 (0.7)	1 (1.1)	22 (0.7)
Source of admission to ICU – no. (%)					
Emergency department	1801 (55.6)	106 (52.0)	1695 (55.9)	45 (50.0)	1756 (55.8)
Hospital ward	1006 (31.1)	59 (28.9)	947 (31.2)	34 (37.8)	972 (30.9)
Transfer from another hospital	417 (12.9)	38 (18.6)	379 (12.5)	11 (12.2)	406 (12.9)
Other	15 (0.5)	1 (0.5)	14 (0.5)	0 (0.0)	15 (0.5)
Coexisting conditions – no. (%)[a]					
Diabetes mellitus, insulin dependent	464 (14.3)	19 (9.3)	445 (14.7)	19 (21.1)	445 (14.1)
Diabetes mellitus, non-insulin dependent	847 (26.2)	53 (26.0)	794 (26.2)	30 (33.3)	817 (26.0)
Hypertension	1977 (61.0)	109 (53.4)	1868 (61.6)	60 (66.7)	1917 (60.9)
Chronic lung disease					
Chronic obstructive pulmonary disease	273 (8.4)	15 (7.4)	258 (8.5)	8 (8.9)	265 (8.4)
Asthma	344 (10.6)	22 (10.8)	322 (10.6)	6 (6.7)	338 (10.7)
Other pulmonary disease	238 (7.4)	16 (7.8)	222 (7.3)	8 (8.9)	230 (7.3)
Current or former smoker	957 (29.6)	62 (30.4)	895 (29.5)	24 (26.7)	933 (29.6)
Alcohol abuse disorder	177 (5.5)	7 (3.4)	170 (5.6)	7 (7.8)	170 (5.4)
Coronary artery disease	431 (13.3)	23 (11.3)	408 (13.4)	19 (21.1)	412 (13.1)
Congestive heart failure	305 (9.4)	13 (6.4)	292 (9.6)	12 (13.3)	293 (9.3)
Chronic liver disease	107 (3.3)	3 (1.5)	104 (3.4)	4 (4.4)	103 (3.3)
Chronic kidney disease	407 (12.6)	21 (10.3)	386 (12.7)	15 (16.7)	392 (12.5)
End stage kidney disease	98 (3.0)	4 (2.0)	94 (3.1)	9 (10.0)	89 (2.8)
Active malignancy	162 (5.0)	9 (4.4)	153 (5.0)	6 (6.7)	156 (5.0)
Immunodeficiency	78 (2.4)	5 (2.5)	73 (2.4)	5 (5.6)	73 (2.3)
HIV/AIDS	48 (1.5)	5 (2.5)	43 (1.4)	0 (0.0)	48 (1.5)
Home medications – no. (%)					
Immunosuppressive medication	339 (10.5)	14 (6.9)	325 (1.1)	15 (16.7)	324 (10.3)
ACE-I	591 (18.3)	31 (15.2)	560 (18.5)	21 (23.3)	570 (18.1)
ARB	527 (16.3)	22 (10.8)	505 (16.6)	13 (14.4)	514 (16.3)
Mineralocorticoid receptor antagonist	84 (2.6)	2 (1.0)	82 (2.7)	7 (7.8)	77 (2.5)
Beta-blocker	868 (26.8)	43 (21.1)	824 (27.2)	33 (36.7)	834 (26.5)
Other antihypertensive	949 (29.3)	52 (25.5)	896 (29.5)	25 (27.8)	923 (29.3)
Statin	1415 (43.7)	113 (55.4)	1301 (42.9)	35 (38.9)	1379 (43.8)
NSAID	267 (8.2)	22 (10.8)	245 (8.1)	3 (3.3)	264 (8.4)
Aspirin	715 (22.1)	41 (21.1)	674 (22.2)	34 (37.8)	681 (21.6)
Anticoagulation	305 (9.4)	7 (3.4)	298 (9.8)	16 (17.8)	289 (9.2)
Vitamin C	84 (2.6)	7 (3.4)	77 (2.5)	7 (7.8)	77 (2.5)
Vitamin D	341 (10.5)	17 (8.3)	324 (10.7)	17 (18.9)	324 (10.3)
Vital signs on the day of ICU admission – median (IQR)					
Temperature – ºC	38.0 (37.3-38.9)	38.1 (37.3-39.0)	38.0 (37.3-38.9)	37.7 (38.8-37.1)	38.0 (37.3-38.9)
Systolic blood pressure – mm Hg	96 (86-111)	96 (85-108)	97 (86-111)	90 (81.5-107.5)	97 (86-111)
Heart rate – beats per min	104 (90-120)	106 (92-120)	104 (90-120)	107 (92-120)	104 (90-120)
Respiratory rate – per min	31 (26-38)	32 (27-39)	31 (26-38)	30 (25-36)	31 (26-38)
Laboratory findings on the day of ICU admission – median (IQR)					
Leukocyte count – per mm^3	8.2 (5.9-11.5)	8.6 (6.5-11.6)	8.16 (5.9 -11.5)	8.55 (5.9-13.2)	8.2 (5.9-11.5)
Hemoglobin – g/dl	12.7 (11.1-14.1)	12.8 (11.3-14.3)	12.7 (11.1-14.1)	12.0 (8.7-13.3)	12.7 (11.2-14.1)
Platelet count – $\times 10^9$ cells/L	213 (163-271)	218 (171-277)	212 (162-270)	177 (133-277)	213 (164-270)
Creatinine – mg/dl	1.07 (0.80-1.62)	1.10 (0.86-1.65)	1.06 (0.80-1.62)	1.48 (0.83-2.69)	1.06 (0.80-1.60)
Albumin – g/dl	3.2 (2.8-3.6)	3.1 (2.8-3.6)	3.2 (2.8-3.6)	3.1 (2.7-3.4)	3.2 (2.8-3.6)
Aspartate aminotransferase – U/L	54 (36-85)	55 (38-90)	54 (36-85)	56 (36-97)	54 (36-85)
Alanine aminotransferase – U/L	36 (23-60)	39 (24-67)	36 (23-59)	37 (23-63)	36 (23-60)
Total bilirubin – µmol/L [mg/dl]	10.3 (6.8-13.7) [0.6 (0.4-0.8)]	12.0 (8.6-15.4) [0.7 (0.5-0.9)]	10.3 (6.8-13.7) [0.6 (0.4-0.8)]	10.3 (6.8-17.1) [0.6 (0.4-1.0)]	10.3 (6.8-13.7) [0.6 (0.4-0.8)]

Lactate – mmol/L	1.5 (1.1-2.3)	1.6 (1.2-2.3)	1.5 (1.1-2.2)	1.7 (1.4-2.6)	1.5 (1.1-2.2)
Arterial pH	7.37 (7.30-7.43)	7.36 (7.30-7.42)	7.37 (7.30-7.43)	7.35 (7.30-7.40)	7.37 (7.30-7.43)
D-dimer – mg/L FEU	1.32 (0.70-3.26)	2.32 (1.01-9.22)	1.29 (0.69-3.05)	3.70 (1.35-15.41)	1.30 (0.70-3.18)
C-reactive protein – mg/L	157.2 (90.0-237.7)	171.0 (102.9-250.3)	156.9 (88.7-237.0)	128.6 (68.6-229.3)	158.0 (91.0-238.0)
Interleukin-6 – pg/mL	58.1 (20.0-158.6)	33.0 (8.0-87.5)	61.4 (21.1-160.2)	31.5 (12.2-54.3)	61.2 (20.0-162.4)
Procalcitonin – ng/ml	0.41 (0.15-1.38)	0.40 (0.18-1.40)	0.41 (0.15-1.37)	0.80 (0.30-3.96)	0.40 (0.15-1.34)
Ferritin – µg/L	1032 (505-2000)	1258 (651-2335)	1013.5 (499-2000)	1457.4 (714-3008)	1019 (501-2000)
Creatine phosphokinase – U/L	207 (97-546)	267 (95-601)	202 (97-546)	172 (87-357)	211 (97-548)
Fibrinogen – g/dL	6.14 (4.97-7.53)	6.31 (4.16-6.92)	6.12 (4.97-7.53)	3.96 (2.85-4.87)	6.17 (5.09-7.55)
High-sensitivity cardiac troponin – ng/L	16 (7-50)	9 (22-98)	16 (7-49)	100 (46-173)	16 (7-48)
Severity-of-illness on the day of ICU admission					
Invasive mechanical ventilation – no. (%)	2132 (65.8)	144 (70.6)	1987 (65.5)	68 (75.6)	2062 (63.7)
FiO_2 - median (IQR)	80 (60-100)	82.5 (50-100)	80 (60-100)	80 (50-100)	80 (60-100)
PEEP, cm of water – median (IQR)	12 (10-15)	14 (10-16)	12 (10-15)	10 (9.5-15)	12 (10-15)
PaO_2:FiO_2, mm Hg – median (IQR)[b]	127 (86-195)	125 (89-201)	127 (86-195)	150 (92-254)	126 (85-194)
Non-invasive mechanical ventilation – no. (%)	706 (21.80)	40 (19.61)	666 (21.94)	7 (7.78)	699 (22.20)
High-flow nasal cannula or non-rebreather mask – no. (%)	648 (20.01)	39 (19.18)	609 (20.07)	7 (7.78)	641 (20.36)
Vasopressors – no. (%)	1364 (42.11)	98 (48.04)	1266 (41.71)	40 (44.44)	1008 (32.01)
Altered mental status – no. (%)	728 (22.48)	55 (26.96)	673 (22.17)	37 (41.11)	691 (21.94)
Acute kidney injury – no. (%)	1164 (37.7)	64 (32.7)	1100 (38.0)	30 (35.7)	1134 (37.7)
Acute liver injury – no. (%)	17 (0.6%)	0 (0.0%)	17 (0.7%)	3 (3.9%)	14 (0.6%)
Renal replacement therapy – no. (%)	118 (3.6)	8 (3.9)	110 (3.6)	6 (6.7)	112 (3.6)

Abbreviations: ACE-I, Angiotensin converting enzyme inhibitor; ARB, Angiotensin II receptor blocker; HIV/AIDS, Human immunodeficiency virus infection/acquired immune deficiency syndrome; NSAID, nonsteroidal anti-inflammatory drug; PEEP, positive end-expiratory pressure.

[a]The definitions of the coexisting disorders are provided in the supplemental material.
[b]PaO_2:FiO_2 refers to the ratio of the partial pressure of arterial oxygen (PaO_2) over the fraction of inspired oxygen (FiO_2),and was only assessed in patients receiving invasive mechanical ventilation.

Data regarding body mass index were missing for 228 patients (7.0%).
Data regarding systolic blood pressure were missing for 4 patients (0.1%).
Data regarding heart rate were missing for 3 patients (0.1%).
Data regarding leukocyte count were missing for 180 patients (5.6%).
Data regarding hemoglobin were missing for 186 patients (5.7%).
Data regarding platelet count were missing for 195 patients (6.0%)
Data regarding creatinine were missing for 149 patients (4.6%).
Data regarding albumin were missing for 617 patients (19.0%).
Data regarding aspartate aminotransferase were missing for 606 patients (18.7%)
Data regarding alanine aminotransferase were missing for 586 patients (18.1%)
Data regarding total bilirubin were missing for 593 patients (18.3%).
Data regarding lactate were missing for 1232 patients (38.0%).
Data regarding arterial pH were missing for 1005 patients (31.0%).
Data regarding D-dimer were missing for 1615 patients (49.9%).
Data regarding C-reactive protein were missing for 1291 patients (39.9%).
Data regarding interleukin-6 were missing for 2595 patients (80.1%).
Data regarding procalcitonin were missing in 1193 patients (36.7%).
Data regarding ferritin were missing in 1423 patients (43.9%).
Data regarding creatine phosphokinase were missing in 1682 patients (51.9%).
Data regarding fibrinogen were missing in 2648 patients (81.8%).
Data regarding high-sensitivity cardiac troponin were missing in 2588 patients (79.9%).
Data regarding FiO2 were missing for 218 out of 2132 mechanically ventilated patients (10.2%).
Data regarding PEEP were missing for 236 out of 2132 mechanically ventilated patients (11.1%).
Data regarding PaO_2:FiO_2 were missing for 354 patients out of 2132 mechanically ventilated patients (16.6%).
Data necessary to determine presence of acute kidney injury on ICU day 1 were missing in 151 patients (4.7%).
Data necessary to determine presence of acute liver injury on ICU day 1 were missing in 593 patients (18.3%).
All other variables had no missing data.

Table 4. Anticoagulants Used in Patients Treated with Therapeutic Anticoagulation. Some patients were transitioned from one agent to another during the course of treatment, and thus the sum of the percentages shown in the table is greater than 100.

Anticoagulant	**No. Patients / Total No. Patients Treated with Therapeutic Anticoagulation (%)**
Unfractionated heparin infusion	884/1412 (62.6)
Low molecular weight heparin (enoxaparin or dalteparin)	486/1412 (34.4)
Bivalirudin	41/1412 (2.9)
Argatroban	32/1412 (2.3)
Other (fondaparinux or oral anticoagulant)	203/1412 (14.4)

Table 5. Indications for Initiation of Therapeutic Anticoagulation in First Two Days of ICU Admission for Patients Included in Target Trial Emulation (n=384). The sum of the numbers below is more than 384 because some patients had more than one reason for receiving therapeutic anticoagulation.

Indication	Number of Patients (%)
Atrial fibrillation or atrial flutter	55 (14.3%)
Acute coronary syndrome/myocardial infarction	33 (8.6%)
Hypercoagulable state associated with COVID-19	199 (51.8%)
Other	159 (41.4%)

SUPPLEMENTAL FIGURES

Figure 1. Number of Cohort Patients by City Among Contributing Sites. Red bubbles demonstrate the number of patients contributed by each site.

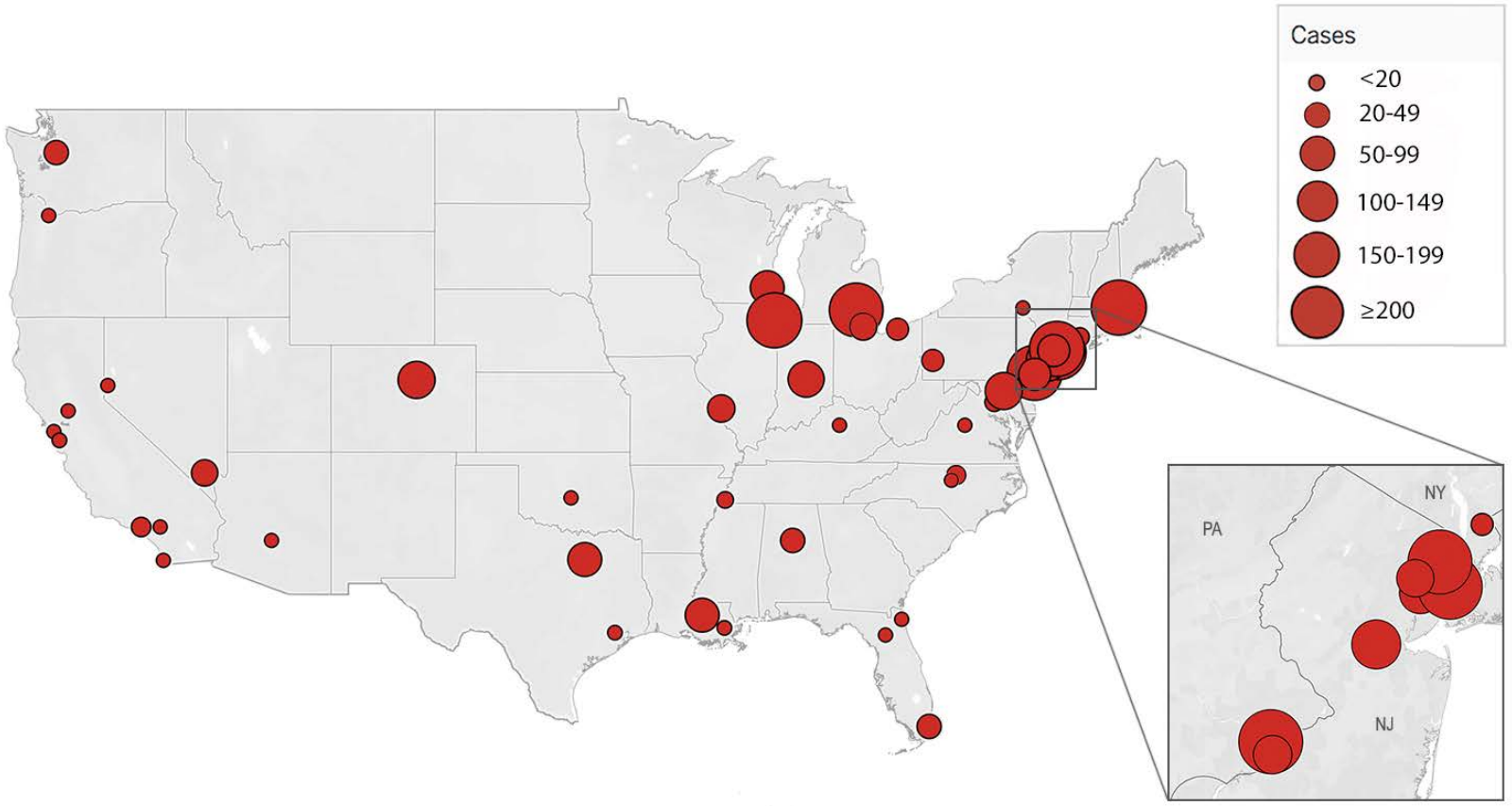
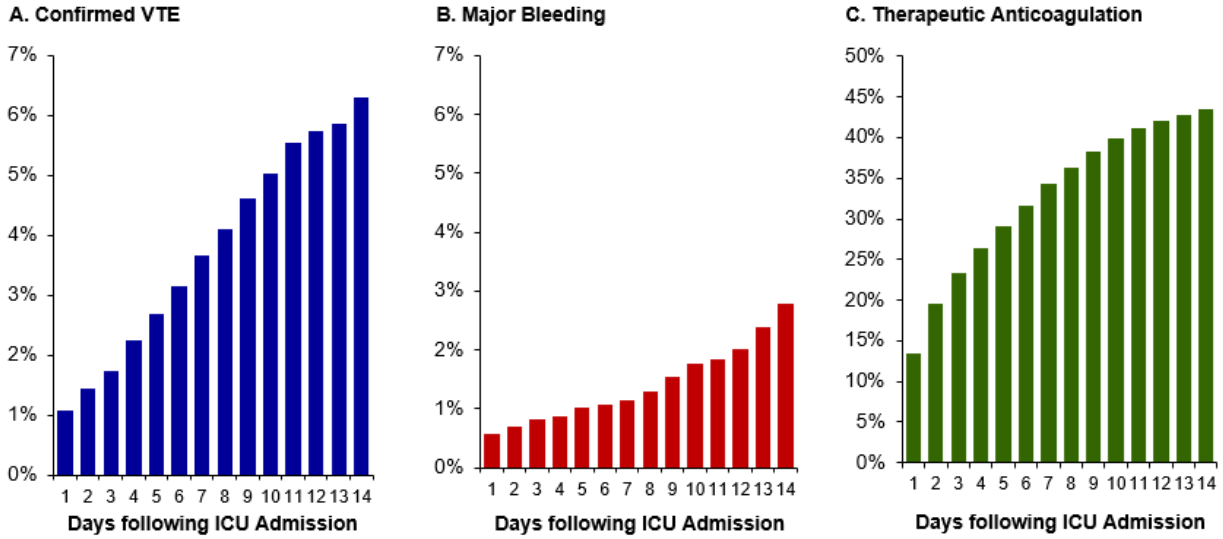


Figure 2. Cumulative incidence of radiographically-confirmed venous thromboembolism **(A)**, major bleeding **(B)**, and initiation of therapeutic anticoagulation **(C)**. Note the different scale of the y-axis in panel C. **(D)** Multivariable model of predictors for VTE. Abbreviations: VTE, venous thromboembolism.



D

Variable	No. Events	No. Patients	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age (yrs)				
18-39	16	278	1.00	1.00
40-59	83	1098	1.32 (0.75-2.34)	1.33 (0.73-2.40)
60-79	96	1564	0.99 (0.56-1.74)	1.03 (0.56-1.88)
>80	9	299	0.45 (0.19-1.06)	0.45 (0.18-1.11)
Male sex	149	2088	1.62 (1.16-2.24)	1.60 (1.13-2.27)
BMI (kg/m^2)				
<30	87	1445	1.00	1.00
30-39.9	74	1111	1.17 (0.84-1.63)	1.20 (0.82-1.74)
≥40	37	455	1.40 (1.92-2.14)	1.55 (0.96-2.48)
Active malignancy	9	162	0.78 (0.38-1.60)	0.89 (0.42-1.86)
Current smoker	7	162	0.63 (0.29-1.39)	0.53 (0.23-1.20)
Shock	24	331	1.08 (0.68-1.71)	0.84 (0.50-1.39)
Respiratory failure	145	2132	1.22 (0.88-1.70)	1.03 (0.72-1.47)
Leukocyte count >11,000/μL	54	850	0.98 (0.70-1.38)	0.80 (0.53-1.20)
Platelet count >350 × 10^9/L	12	284	0.58 (0.31-1.08)	0.52 (0.27-1.00)
Therapeutic AC on ICU Day 1	36	429	1.46 (0.98-2.16)	1.19 (0.77-1.83)
Aspirin on ICU Day 1	22	344	1.09 (0.68-1.75)	1.33 (0.79-2.23)
D-Dimer (mg/L)				
≤1.000	26	642	1.00	1.00
1.001-2.500	27	504	1.64 (1.07-2.51)	1.79 (1.14-2.81)
2.501-10.000	26	299	2.31 (1.18-4.52)	2.70 (1.32-5.53)
>10.000	24	179	3.89 (1.63-9.28)	4.71 (1.57-14.13)

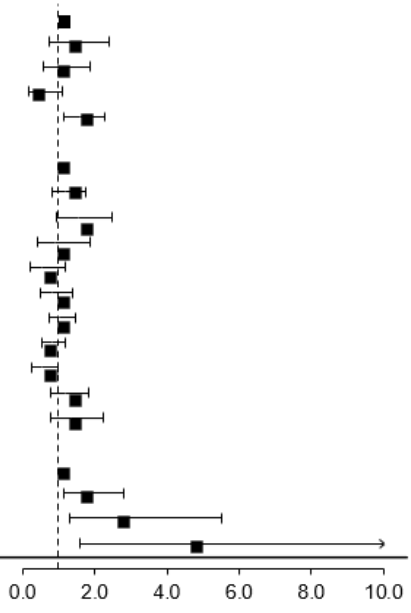


Figure 3. Interhospital Variation in the Incidence of VTE and Use of Therapeutic Anticoagulation.

(A) Interhospital variation in the incidence of VTE. Among 67 total hospitals treating 3239 patients, 32 hospitals (treating a total of 400 patients) were excluded from this analysis due to having submitted data on fewer than 30 patients each. The risk- and reliability-adjusted incidence of VTE varied across hospitals, with a median incidence of 5.2% and a range of 1.1% at the lowest incidence hospital to 17.7% at the highest. The median odds ratio, which represents the difference in odds of VTE between a randomly-selected lower-VTE incidence hospital and a randomly-selected higher-VTE incidence hospital, was 2.34 (95% CI, 1.65-3.03).

(B) Interhospital variation in the use of therapeutic anticoagulation. Among 67 total hospitals treating 3239 patients, 8 hospitals (treating a total of 32 patients) were excluded from this analysis due to having submitted data on fewer than 10 patients each. The risk- and reliability-adjusted rate of therapeutic anticoagulation use varied across hospitals, with a median rate of 39.8% and a range of 15.1% at the lowest-use hospital to 78.5% at the highest. The median odds ratio, which represents the difference in odds of therapeutic anticoagulation use between a randomly-selected lower-use hospital and a randomly-selected higher-use hospital, was 2.08 (95% CI, 1.77-2.39).

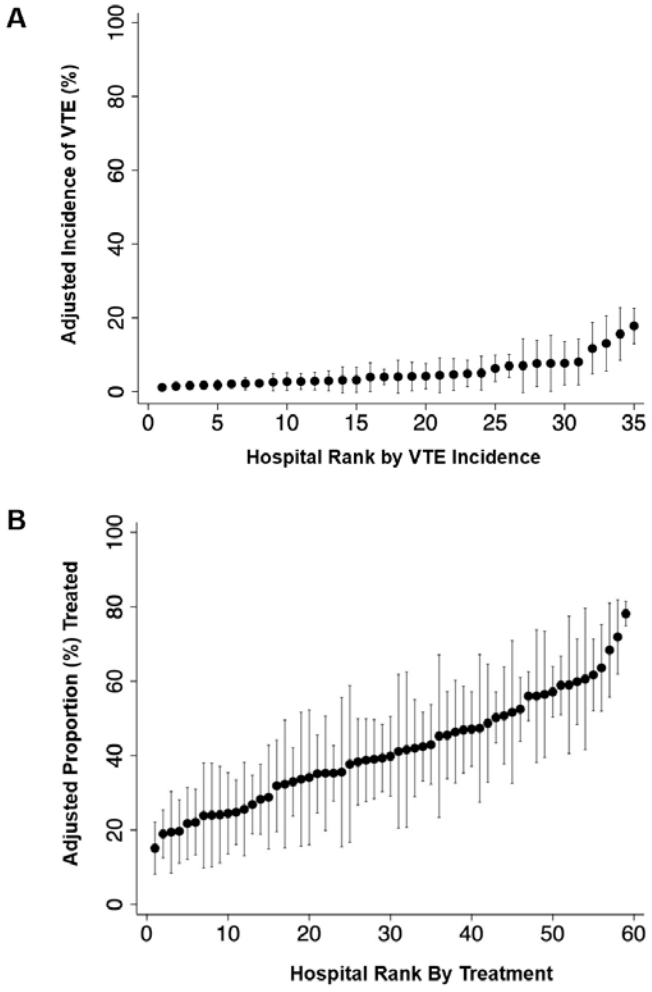


Figure 4. Rates of VTE by Sex across Categories of (A) BMI and (B) D-dimer.

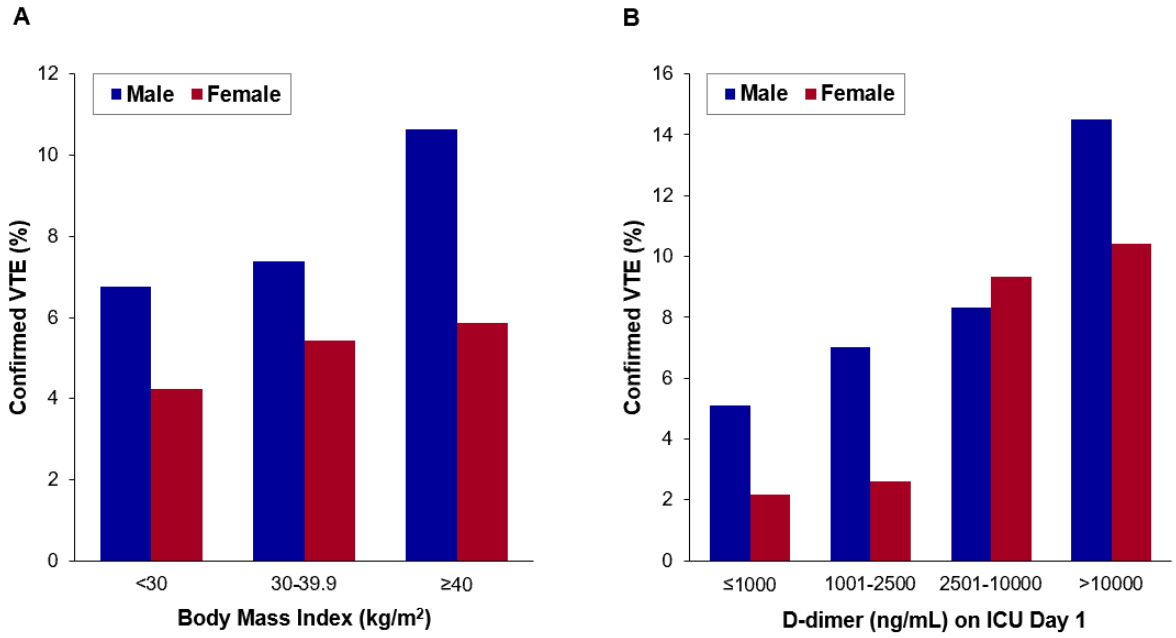
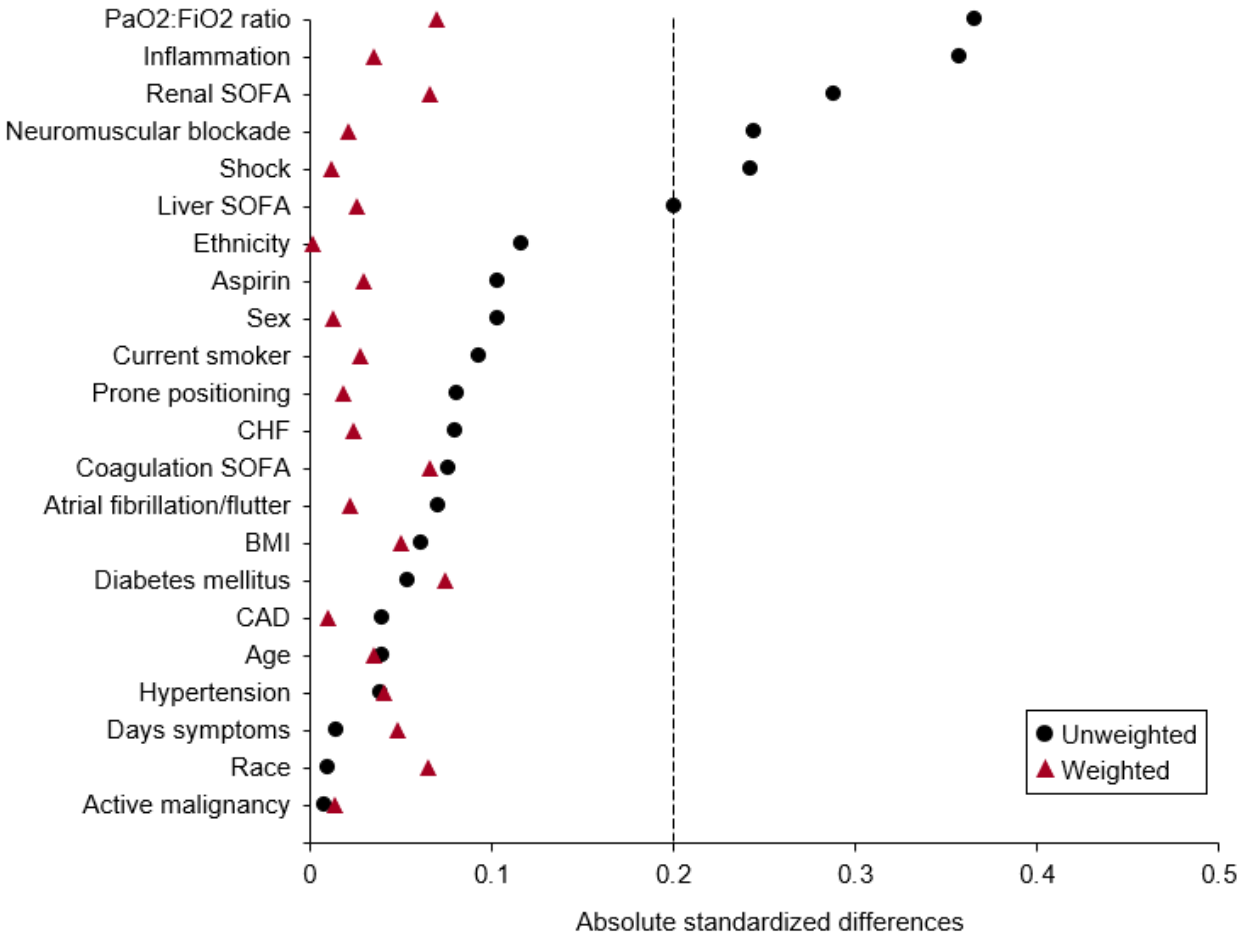


Figure 5. Standardized Differences Before and After Applying Inverse Probability of Treatment Weighting. This figure shows the absolute standardized differences for each of the 22 baseline and acute severity-of-illness covariates in the unweighted sample and after applying the weights derived from the inverse probability weighting. A vertical line has been superimposed denoting a standardized difference of 0.2, as effects sizes below 0.2 are often considered to be small [7], and effects sizes below 0.1 are often considered to be very small [8]. The standardized differences in the unweighted sample exceeded 0.2 for six of the 22 covariates. In contrast, the standardized differences in the weighted sample were below 0.1 for all 22 covariates, indicating that the groups were well balanced across the 22 covariates.



SUPPLEMENTAL REFERENCES

1. Rubin DB. *Multiple Imputation for Nonresponse in Surveys.* New York: John Wiley & Sons; 1987.
2. Xu S, Ross C, Raebel MA, Shetterly S, Blanchette C, Smith D. Use of stabilized inverse propensity scores as weights to directly estimate relative risk and its confidence intervals. *Value Health.* 2010;13(2):273-277.
3. Vincent JL, Moreno R, Takala J, et al. The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure. On behalf of the Working Group on Sepsis-Related Problems of the European Society of Intensive Care Medicine. *Intensive Care Med.* 1996;22(7):707-710.
4. Raith EP, Udy AA, Bailey M, et al. Prognostic Accuracy of the SOFA Score, SIRS Criteria, and qSOFA Score for In-Hospital Mortality Among Adults With Suspected Infection Admitted to the Intensive Care Unit. *JAMA.* 2017;317(3):290-300.
5. Jentzer JC, Bennett C, Wiley BM, et al. Predictive Value of the Sequential Organ Failure Assessment Score for Mortality in a Contemporary Cardiac Intensive Care Unit Population. *J Am Heart Assoc.* 2018;7(6).
6. Aakre C, Franco PM, Ferreyra M, Kitson J, Li M, Herasevich V. Prospective validation of a near real-time EHR-integrated automated SOFA score calculator. *Int J Med Inform.* 2017;103:1-6.
7. Cohen J. *Statistical Power Analysis for the Behavioral Sciences.* 2nd ed. Hillsdale, NJ; 1988.
8. Austin PC, Stuart EA. Moving towards best practice when using inverse probability of treatment weighting (IPTW) using the propensity score to estimate causal treatment effects in observational studies. *Stat Med.* 2015;34(28):3661-3679.

Confirmation of eligibility

Study ID _____

The questions in this instrument will confirm whether the patient is eligible

Once all questions have been answered in an instrument, change the status from "incomplete" to "complete".

Supplemental instructions, FAQ, and tips can be downloaded here. Please read this document carefully before you begin entering data. Note, the FAQ section of this document will be updated every 1-2 days.

[Attachment: "REDCap instructions & FAQ 4-6-20.pdf"]

Lab value converter can be downloaded here (to convert the units for CRP, D-Dimer, and lactate, if needed)

[Attachment: "STOP-COVID Lab Value Converter -v2.xlsx"]

Adult aged 18 or older?
◯ Yes
◯ No

STOP, THIS PATIENT IS NOT ELIGIBLE

Laboratory-confirmed diagnosis of COVID-19?
◯ Yes
◯ No

STOP, THIS PATIENT IS NOT ELIGIBLE

Date the positive COVID-19 test was obtained
-Refers to the date the patient was tested, not the date the result came back
-If multiple tests were sent, provide the date of the initial positive test, even if it was obtained at an outside facility
-Ok to use an estimate if exact date unavailable
_____

Hospitalized in the ICU for illness related to COVID-19?
Do not include patients admitted to the ICU for reasons unrelated to COVID-19 who later tested positive on "routine surveillance" only and never showed signs or symptoms consistent with COVID-19.

Patients in non-ICU rooms that have been "converted" into ICU rooms for surge capacity are eligible under any of the following conditions:
a) being treated by an ICU team
b) receiving invasive mechanical ventilation or ECMO
c) receiving continuous renal replacement therapy (e.g., CVVH)
d) receiving vasopressors/inotropes or mechanical cardiac support (e.g., LVAD) in a room where this would traditionally not be permitted

◯ Yes
◯ No

STOP, THIS PATIENT IS NOT ELIGIBLE

THIS PATIENT IS ELIGIBLE, PROCEED WITH DATA ENTRY

Additional Notes (if any)

Institutional Data

Enter your name The name of the person entering data, not the name of the patient	_____
Enter your email address	_____
Was the patient admitted to the main hospital within your medical center, or to a satellite/affiliate of the main hospital? If admitted to one hospital and then transferred to another, please review the answer to Question7 in the FAQ section of the REDCap instructions document	◯ Main Hospital ◯ Satellite/affiliate
Enter name of the main hospital	_____
Enter name of satellite/affiliate	_____
How many regular adult ICU beds does this hospital have? -Do not include surge capacity beds -If the patient was admitted to a satellite/affiliate hospital, only enter the #ICU beds at that specific site	_____
Indicate the state (2-letter abbreviation) in which the hospital is located	_____
Additional Notes (if any)	_____

Demographics, Symptoms, Comorbidities, Home Medications

Age (in years)	_____
Gender	◯ Male ◯ Female
Ethnicity	◯ Hispanic or Latino ◯ Not Hispanic or Latino ◯ Unknown / Not Reported
Race Do not select, "Unknown / Not Reported" unless this information is truly unavailable	◯ White ◯ Black or African American ◯ Asian ◯ American Indian/Alaska Native ◯ Native Hawaiian or Other Pacific Islander ◯ More Than One Race ◯ Unknown / Not Reported
Pregnant at the time of ICU admission?	◯ Yes ◯ No
How many weeks pregnant on ICU admission?	_____ (Round up or down to the nearest integer value)
Enter the outcome of the fetus by the end of the hospitalization (e.g., "both the mother and fetus survived the hospitalization", or "fetus terminated at week XXX due to XXX", etc.)	_____
Source of admission to the ICU	◯ Emergency department ◯ Hospital ward ◯ Transfer from another hospital ◯ Other
Suspected setting in which COVID-19 infection occurred *Healthcare worker is defined as a doctor, nurse, technician, or other medical professional who provides direct care to patients (do not include ancillary staff such as clerks, pharmacists, or kitchen/cleaning staff)	◯ Community-acquired ◯ Nosocomial ◯ Occupational (healthcare worker)* ◯ Unknown
Type of healthcare worker	◯ Doctor ◯ Nurse ◯ Other
Date symptoms first began? Ok to use an estimate if exact date is unavailable	_____

Symptom(s) that began prior to ICU admission (select all that apply) Include symptoms that began at home as well as those that began in the hospital prior to ICU admission	☐ Cough ☐ Sputum production ☐ Hemoptysis ☐ Sore throat ☐ Nasal congestion ☐ Headache ☐ Fever ☐ Chills ☐ Shortness of breath ☐ Nausea or vomiting ☐ Diarrhea ☐ Myalgia or arthralgia ☐ Confusion or altered mental status ☐ Fatigue or malaise ☐ None of the above
Other symptom(s) that began prior to ICU admission? Examples include chest pain/tightness, dizziness, and anosmia (lack of smell)	_____
Cardiovascular and pulmonary comorbidities prior to ICU admission *CAD includes any history of angina, myocardial infarction, or coronary artery bypass graft surgery **CHF includes both HFrEF and HFpEF	☐ Diabetes mellitus ☐ Hypertension ☐ Coronary artery disease (CAD)* ☐ Congestive heart failure (CHF)** ☐ Atrial fibrillation/flutter ☐ COPD ☐ Asthma ☐ Other lung disease ☐ None of the above
Was the diabetes insulin-dependent or non-insulin-dependent?	◯ Insulin-dependent ◯ Non-insulin-dependent
Enter the other lung disease	_____
Tobacco smoking status Do not include vaping or smoking of non-tobacco products	◯ Non-smoker ◯ Former smoker ◯ Current smoker ◯ Unknown
How many pack-years of smoking history? If not available enter, "N/A"	_____
History of alcohol abuse	◯ Yes ◯ No ◯ Unknown
Currently homeless	◯ Yes ◯ No ◯ Unknown

Additional comorbidities prior to ICU admission *Chronic Kidney Disease (CKD) is defined as a baseline eGFR< 60 on at least two consecutive values at least 12 weeks apart prior to hospital admission. If not available, defined as per medical history **Chronic liver disease includes cirrhosis, alcohol-related liver disease, nonalcoholic fatty liver disease, autoimmune hepatitis, hepatitis B or hepatitis C, primary biliary cirrhosis, and others ***Active malignancy is defined as any malignancy (other than non-melanoma skin cancer) that was treated in the prior year	☐ CKD* ☐ ESRD on hemodialysis or peritoneal dialysis ☐ Chronic liver disease** ☐ HIV/AIDS ☐ Active malignancy*** ☐ Solid organ transplant ☐ Bone marrow transplant ☐ Other immunodeficiency ☐ None of the above
Dialysis modality prior to hospital admission	◯ In-center hemodialysis ◯ Home hemodialysis ◯ Peritoneal dialysis
Type of vascular access used prior to hospital admission	◯ Catheter ◯ Arteriovenous fistula (AVF) ◯ Arteriovenous graft (AVG)
How long had the patient been receiving maintenance dialysis therapy prior to ICU admission?	◯ < 6 months ◯ Between 6 and 12 months ◯ Between 1 and 2.9 years ◯ Between 3 and 4.9 years ◯ 5 or more years ◯ Unknown
Does the patient have a history of a failed kidney transplant?	◯ Yes ◯ No ◯ Unknown
Type of chronic liver disease	☐ Alcohol-related ☐ Non-alcoholic fatty liver disease/NASH ☐ Hepatitis B virus ☐ Hepatitis C virus ☐ Autoimmune hepatitis ☐ Primary biliary cirrhosis ☐ Other
Enter other chronic liver disease	_____
Type of malignancy	☐ Lung cancer ☐ Breast cancer ☐ Colorectal cancer ☐ Prostate cancer ☐ Gastric cancer ☐ Pancreatic cancer ☐ Melanoma ☐ Ovarian cancer ☐ Brain cancer ☐ Other cancer
Enter the other malignancy	_____

Type of solid organ transplant	☐ Kidney ☐ Liver ☐ Heart ☐ Lung ☐ Other
Enter the other solid organ transplant type	_____
Enter the other immunodeficiency	_____
At least one baseline serum creatinine value available? Defined as a value between 365 to 7 days PRIOR to hospitalization	◯ Yes ◯ No
Baseline serum creatinine (mg/dl) Defined as the LOWEST value within 365 to 7 days prior to hospital admission	_____
Serum creatinine (mg/dl) on HOSPITAL admission	_____
Anti-hypertensive meds prior to hospital admission (select all that apply) ACE-Is include lisinopril, fosinopril, captopril, and others ARBs include losartan, valsartan, irbesartan, and others MRAs include spironolactone and eplerenone	☐ ACE-I ☐ ARB ☐ Mineralicorticoid receptor antagonist (MRA) ☐ Beta-blocker ☐ Other anti-hypertensive ☐ None of the above
Enter the other anti-hypertensive(s) If entering more than one, separate with commas	_____
Other meds prior to hospital admission (select all that apply). Note: only refers to home meds (don't include meds started at an outside hospital) Statins include atorvastatin, pravastatin, rosuvastatin, and others NSAIDs include ibuprofen (Advil, Motrin), naproxen (Aleve), and others For vitamins C and D, do not include if the only source was a multivitamin *Include these meds if any were taken within 1 week prior to hospital admission	☐ Statin ☐ NSAID ☐ Aspirin ☐ Vitamin C ☐ Vitamin D ☐ Chloroquine* ☐ Hydroxychloroquine* ☐ Azithromycin* ☐ None of the above

Therapeutic anticoagulants prior to admission Do not include anti-platelet agents such as aspirin or clopidogrel (Plavix) as "other anticoagulant"	☐ Warfarin (Coumadin) ☐ Lovenox (Enoxaparin) ☐ Apixaban (Eliquis) ☐ Rivaroxaban (Xarelto) ☐ Other anticoagulant ☐ None of the above
Select if the patient received any of the following immunosuppressive medications in the 30 days prior to ICU admission *Do not include immunotherapy, such as immune checkpoint inhibitors (e.g., nivolumab) **CNIs include tacrolimus and cyclosporine; do not include CNIs applied topically (i.e., as an ointment)	☐ Chemotherapy* ☐ Corticosteroids >10mg prednisone/day (or equivalent) ☐ Calcineurin inhibitor (CNI)** ☐ Mycophenolate mofetile (Cellcept) ☐ Azathioprine (Imuran) ☐ Rituximab ☐ Other major immunosuppressive therapy ☐ None of the above
Enter the other major immunosuppressive medication(s) the patient was taking	_____
Additional Notes (if any) Please do not use this space to enter additional medications or comorbidities	_____

Vital Signs And Severity-of-Illness On ICU Day 1

Unless otherwise specified, the timing of the data below refers to ICU Day1, defined as the 24h period from midnight PRIOR to ICU admission to midnight AFTER ICU admission. For example, if a patient is admitted to an ICU at 10pm, 22 of the 24 hours for ICU Day1 would actually be from prior to ICU arrival (e.g., from the ED or hospital ward). See timeline in the "REDCap instructions" PDF for additional details.

Weight on ICU Day1 (or closest value prior)
-Can enter in either kg or lbs
-If none available, enter, "N/A"

_____

Units for weight
Be sure to select the correct unit

◯ Kilograms
◯ Pounds

Height
-Can enter in either cm or inches
-If not available, enter, "N/A"

_____

Units for height
Be sure to select the correct unit

◯ Centimeters
◯ Inches

Date of hospital admission
If hospitalized elsewhere and then transferred to your hospital, enter the date of the initial hospitalization (e.g., if initially at "Hospital A" and then transferred to "Hospital B", enter the date admitted to Hospital A)

_____

Date of ICU admission
-If admitted to an outside/satellite/affiliate ICU and then transferred to an ICU at your hospital, enter the date admitted to the ICU at your hospital
-If the patient had multiple ICU admissions at your hospital during their overall admission for COVID-19, enter the date of the initial ICU admission at your hospital

_____

Admitted to a COVID-specific ICU?
Defined as an ICU where all patients have suspected or confirmed COVID-19

◯ Yes
◯ No

Type of ICU
A non-ICU bed qualifies as a having been "converted" to an ICU bed for surge capacity if any of the following are present:
a) being treated by an ICU team
b) receiving invasive mechanical ventilation or ECMO
c) receiving continuous renal replacement therapy (e.g., CVVH)
d) receiving vasopressors/inotropes or mechanical cardiac support (e.g., LVAD) in a room where this would traditionally not be permitted

- ◯ Medical ICU
- ◯ Cardiac ICU
- ◯ Surgical/Trauma/Burn ICU
- ◯ Neuro ICU
- ◯ Non-ICU bed converted into an ICU bed for surge capacity

Highest temperature on ICU Day1
Can enter in either F or C

_____

Units for temperature

- ◯ Fahrenheit
- ◯ Celsius

Lowest systolic blood pressure on ICU Day1
Irrespective of whether on pressors or not

_____

Highest heart rate on ICU Day1

_____

Highest respiratory rate on ICU Day1
Irrespective of whether on ventilator not

_____

What type of mechanical ventilation/oxygen delivery did the patient require on ICU Day1?
-Invasive mechanical ventilation refers to mechanical ventilation delivered via endotracheal or tracheal tube
-If more than one, select the highest level of support
-If nasal cannula or regular facemask only, select "none of the above"

- ◯ Invasive mechanical ventilation
- ◯ BiPaP or CPAP
- ◯ High-flow nasal cannula or non-rebreather mask
- ◯ None of the above

Did the patient have any confirmed or suspected infection(s) on ICU Day1 other than COVID-19?
*Only select bacterial pneumonia if the patient had positive cultures (e.g., sputum or blood), a positive urine antigen for pneumococcus or legionella, or a new infiltrate on chest imaging (CXR or CT) suspected to be separate from COVID-related pneumonia

**Examples of viral respiratory infections include influenza, parainfluenza, and RSV

***Only if confirmed by blood cultures and/or cardiac imaging

- ☐ Bacterial Pneumonia*
- ☐ Viral respiratory infection**
- ☐ Urosepsis
- ☐ Biliary sepsis
- ☐ Cellulitis
- ☐ Bacteremia or endocarditis***
- ☐ Other
- ☐ None of the above

Enter the viral respiratory infection

_____

Enter the other infection

_____

Enter the number of antibiotics the patient was treated with on ICU Day1
-Do not include antivirals, antifungals, or antimalarials (e.g., chloroquine or hydroxychloroquine).
-Commonly used antibiotics include vancomycin, piperacillin-tazobactim (Zosyn), azithromycin, cephalosporins, quinolones, etc.

◯ 0
◯ 1
◯ 2
◯ 3
◯ 4
◯ 5 or more

Was the patient treated with oseltamivir (Tamiflu) on ICU Day1?
Includes patients who were started on Tamiflu PRIOR to ICU Day1, as long as they continued to receive it on ICU Day1

◯ Yes
◯ No

Enter procalcitonin level (ng/ml) if checked within 24h before or 24h after admission to the ICU
-If more than one available, enter the value closest to ICU admission
-If none available, enter "N/A"
-If < assay, enter 0
-If > assay, enter the upper limit of the assay and do not include the ">" symbol

_____

Enter CPK level (U/L) if checked within 24h before or 24h after admission to the ICU
-If more than one available, enter the value closest to ICU admission
-If none available, enter "N/A"
-If < assay, enter 0
-If > assay, enter the upper limit of the assay

_____

Enter sodium level (mEq/L) if checked within 24h before or 24h after admission to the ICU
-If more than one available, enter the value closest to ICU admission
-If none available, enter "N/A"

_____

Altered mental status on ICU Day1?
For patients who are intubated/sedated, use the most recent exam prior to intubation/sedation

◯ Yes
◯ No
◯ Data not available

Additional notes (if any)

_____

Longitudinal Data On Labs And Physiologic Parameters in the First 14 Days following ICU Admission

The questions below refer to the first 14 days following ICU admission. Even if the patient was in the ICU for less than 14 days and was transferred to the hospital floor, continue to enter data for the full 14 days or until discharged from the hospital or death (whichever occurs first). We highly recommend waiting to fill out this instrument (and future instruments) until the first of death, hospital discharge, at least 14 days of survival data is available.
Each ICU Day is a discrete 24h period, from midnight to midnight. ICU Day1 refers to the 24h period from the midnight PRIOR to ICU admission to the midnight AFTER ICU admission. For example, if a patient was admitted to an ICU at 10pm, 22 of the 24 hours for ICU Day1 would actually be from prior to arrival in the ICU. See timeline in the "REDCap instructions" PDF for additional details.
If more than one lab value is available on any given day, use the first one. If there is no value available that day, leave the field blank (i.e., do NOT write, "N/A" here)
-If a lab is below assay (e.g., Troponin< 6), enter 0
-If a lab is above assay (e.g., IL-6>3,000), enter the upper limit of the assay (e.g., "3,000")
-Do not incude any units or "%" in these fields; only enter numbers
-If both an arterial and venous lactate are available on the same day, enter the arterial value, otherwise enter the venous value
Please pay close attention to the units, particularly for CRP, D-dimer, and troponin, and convert to the units we are using if needed. For example, if your lab reports troponin in ng/ml, multiply the values by 1,000 to convert to ng/L

Labs

Physiologic parameters

Labs 2

Physiologic parameters 2

Mechanical support dates

	ICU Day1	Day2	Day3	Day4	Day5	Day6	Day7
Invasive Mechanical Ventilation*	☐	☐	☐	☐	☐	☐	☐
ECMO	☐	☐	☐	☐	☐	☐	☐
Renal Replacement Therapy (RRT)**	☐	☐	☐	☐	☐	☐	☐
Mechanical Cardiac Support***	☐	☐	☐	☐	☐	☐	☐

Check the box if the patient received any of the associated therapies on that day
*If a patient received any invasive mechanical ventilation that day, check the box, even if they were extubated that day.
**For patients who received RRT intermittently (e.g., every other day), continue to check the box as long as they are RRT-dependent, even if they didn't actually receive RRT on that specific day
***Includes Impella, Intra-aortic balloon pump (IABP), LVAD, RVAD

Mechanical support dates 2

	Day8	Day9	Day10	Day11	Day12	Day13	Day14
Invasive Mechanical Ventilation*	☐	☐	☐	☐	☐	☐	☐
ECMO	☐	☐	☐	☐	☐	☐	☐
Renal Replacement Therapy (RRT)**	☐	☐	☐	☐	☐	☐	☐
Mechanical Cardiac Support***	☐	☐	☐	☐	☐	☐	☐

Type of ECMO

◯ Veno-venous (V-V)
◯ Veno-arterial (V-A)
◯ Veno-arterial-venous (V-A-V)

Was the ECMO successfully decannulated (removed) during the first 14 days following ICU admission?
If the ECMO was decannulated for palliative purposes, select "no"

◯ Yes
◯ No

Date ECMO was decannulated

_____

Initial mode of RRT

◯ Continuous (CRRT) - 24h/day
◯ Continuous (CRRT) - 12h/day or less
◯ Intermittent hemodialysis
◯ Peritoneal dialysis
◯ Other

Type of mechanical cardiac support (select all that apply)

☐ Impella
☐ Intra-aortic balloon pump (IABP)
☐ LVAD
☐ RVAD
☐ Other

Enter other mechanical cardiac support

_____

Mech support dates 1

_____

Mech support dates 2

_____

Mech support dates 3

_____

Mech support dates 4

_____

Mech support dates 5

_____

Mech support dates 6

_____

Mech support dates 7

_____

Mech support dates 8	
Mech support dates 9	
Mech support dates 10	
Mech support dates 11	
Mech support dates 12	
Mech support dates 13	
Mech support dates 14	
Labs Date Day 1	
Labs Date Day 2	
Labs Date Day 3	
Labs Date Day 4	
Labs Date Day 5	
Labs Date Day 6	
Labs Date Day 7	
Labs Date Day 8	
Labs Date Day 9	
Labs Date Day 10	
Labs Date Day 11	

Labs Date Day 12

Labs Date Day 13

Labs Date Day 14

White cell count day 1

White cell count day 2

White cell count day 3

White cell count day 4

White cell count day 5

White cell count day 6

White cell count day 7

White cell count day 8

White cell count day 9

White cell count day 10

White cell count day 11

White cell count day 12

White cell count day 13

White cell count day 14

Lymphocyte percentage day 1

Lymphocyte percentage day 2	
Lymphocyte percentage day 3	
Lymphocyte percentage day 4	
Lymphocyte percentage day 5	
Lymphocyte percentage day 6	
Lymphocyte percentage day 7	
Lymphocyte percentage day 8	
Lymphocyte percentage day 9	
Lymphocyte percentage day 10	
Lymphocyte percentage day 11	
Lymphocyte percentage day 12	
Lymphocyte percentage day 13	
Lymphocyte percentage day 14	
Hemoglobin Day 1	
Hemoglobin Day 2	
Hemoglobin Day 3	
Hemoglobin Day 4	
Hemoglobin Day 5	

Hemoglobin Day 6	
Hemoglobin Day 7	
Hemoglobin Day 8	
Hemoglobin Day 9	
Hemoglobin Day 10	
Hemoglobin Day 11	
Hemoglobin Day 12	
Hemoglobin Day 13	
Hemoglobin Day 14	
Platelet count day 1	
Platelet count day 2	
Platelet count day 3	
Platelet count day 4	
Platelet count day 5	
Platelet count day 6	
Platelet count day 7	
Platelet count day 8	
Platelet count day 9	

Platelet count day 10	
Platelet count day 11	
Platelet count day 12	
Platelet count day 13	
Platelet count day 14	
Creatinine Day 1	
Creatinine day 2	
Creatinine day 3	
Creatinine day 4	
Creatinine day 5	
Creatinine day 6	
Creatinine day 7	
Creatinine day 8	
Creatinine day 9	
Creatinine day 10	
Creatinine day 11	
Creatinine day 12	
Creatinine day 13	

Creatinine day 14

Albumin day 1

Albumin day 2

Albumin day 3

Albumin day 4

Albumin day 5

Albumin day 6

Albumin day 7

Albumin day 8

Albumin day 9

Albumin day 10

Albumin day 11

Albumin day 12

Albumin day 13

Albumin day 14

AST day 1

AST day 2

AST day 3

AST day 4

AST day 5

AST day 6

AST day 7

AST day 8

AST day 9

AST day 10

AST day 11

AST day 12

AST day 13

AST day 14

ALT day 1

ALT day 2

ALT day 3

ALT day 4

ALT day 5

ALT day 6

ALT day 7

ALT day 8	
ALT day 9	
ALT day 10	
ALT day 11	
ALT day 12	
ALT day 13	
ALT day 14	
Total bilirubin day 1	
Total bilirubin day 2	
Total bilirubin day 3	
Total bilirubin day 4	
Total bilirubin day 5	
Total bilirubin day 6	
Total bilirubin day 7	
Total bilirubin day 8	
Total bilirubin day 9	
Total bilirubin day 10	
Total bilirubin day 11	

Total bilirubin day 12

Total bilirubin day 13

Total bilirubin day 14

Lactate day 1

Lactate day 2

Lactate day 3

Lactate day 4

Lactate day 5

Lactate day 6

Lactate day 7

Lactate day 8

Lactate day 9

Lactate day 10

Lactate day 11

Lactate day 12

Lactate day 13

Lactate day 14

CRP day 1

CRP day 2

CRP day 3

CRP day 4

CRP day 5

CRP day 6

CRP day 7

CRP day 8

CRP day 9

CRP day 10

CRP day 11

CRP day 12

CRP day 13

CRP day 14

IL-6 day 1

IL-6 day 2

IL-6 day 3

IL-6 day 4

IL-6 day 5

IL-6 day 6

IL-6 day 7

IL-6 day 8

IL-6 day 9

IL-6 day 10

IL-6 day 11

IL-6 day 12

IL-6 day 13

IL-6 day 14

Arterial pH day 1

Arterial pH day 2

Arterial pH day 3

Arterial pH day 4

Arterial pH day 5

Arterial pH day 6

Arterial pH day 7

Arterial pH day 8

Arterial pH day 9

Arterial pH day 10	
Arterial pH day 11	
Arterial pH day 12	
Arterial pH day 13	
Arterial pH day 14	
Fibrinogen day 1	
Fibrinogen day 2	
Fibrinogen day 3	
Fibrinogen day 4	
Fibrinogen day 5	
Fibrinogen day 6	
Fibrinogen day 7	
Fibrinogen day 8	
Fibrinogen day 9	
Fibrinogen day 10	
Fibrinogen day 11	
Fibrinogen day 12	
Fibrinogen day 13	

Fibrinogen day 14	
D dimer day 1	
D dimer day 2	
D dimer day 3	
D dimer day 4	
D dimer day 5	
D dimer day 6	
D dimer day 7	
D dimer day 8	
D dimer day 9	
D dimer day 10	
D dimer day 11	
D dimer day 12	
D dimer day 13	
D dimer day 14	
Ferritin Day 1	
Ferritin Day 2	
Ferritin Day 3	

Ferritin Day 4

Ferritin Day 5

Ferritin Day 6

Ferritin Day 7

Ferritin Day 8

Ferritin Day 9

Ferritin Day 10

Ferritin Day 11

Ferritin Day 12

Ferritin Day 13

Ferritin Day 14

Troponin T day 1

Troponin T day 2

Troponin T day 3

Troponin T day 4

Troponin T day 5

Troponin T day 6

Troponin T day 7

Troponin T day 8	
Troponin T day 9	
Troponin T day 10	
Troponin T day 11	
Troponin T day 12	
Troponin T day 13	
Troponin T day 14	
Troponin I day 1	
Troponin I day 2	
Troponin I day 3	
Troponin I day 4	
Troponin I day 5	
Troponin I day 6	
Troponin I day 7	
Troponin I day 8	
Troponin I day 9	
Troponin I day 10	
Troponin I day 11	

Troponin I day 12	
Troponin I day 13	
Troponin I day 14	
PaO2 day 1*	
PaO2 day 2*	
PaO2 day 3*	
PaO2 day 4*	
PaO2 day 5*	
PaO2 day 6*	
PaO2 day 7*	
PaO2 day 8*	
PaO2 day 9*	
PaO2 day 10*	
PaO2 day 11*	
PaO2 day 12*	
PaO2 day 13*	
PaO2 day 14*	
FiO2 day 1	

FiO2 day 2

FiO2 day 3

FiO2 day 4

FiO2 day 5

FiO2 day 6

FiO2 day 7

FiO2 day 8

FiO2 day 9

FiO2 day 10

FiO2 day 11

FiO2 day 12

FiO2 day 13

FiO2 day 14

PEEP day 1

PEEP day 2

PEEP day 3

PEEP day 4

PEEP day 5

PEEP day 6	
PEEP day 7	
PEEP day 8	
PEEP day 9	
PEEP day 10	
PEEP day 11	
PEEP day 12	
PEEP day 13	
PEEP day 14	
24h Urine Output Day 1	
24h Urine Output Day 2	
24h Urine Output Day 3	
24h Urine Output Day 4	
24h Urine Output Day 5	
24h Urine Output Day 6	
24h Urine Output Day 7	
24h Urine Output Day 8	
24h Urine Output Day 9	

24h Urine Output Day 10	
24h Urine Output Day 11	
24h Urine Output Day 12	
24h Urine Output Day 13	
24h Urine Output Day 14	
Max #vasopressors/inotropes day 1	
Max #vasopressors/inotropes day 2	
Max #vasopressors/inotropes day 3	
Max #vasopressors/inotropes day 4	
Max #vasopressors/inotropes day 5	
Max #vasopressors/inotropes day 6	
Max #vasopressors/inotropes day 7	
Max #vasopressors/inotropes day 8	
Max #vasopressors/inotropes day 9	
Max #vasopressors/inotropes day 10	
Max #vasopressors/inotropes day 11	
Max #vasopressors/inotropes day 12	
Max #vasopressors/inotropes day 13	

Max #vasopressors/inotropes day 14

_____

Additional Notes (if any)

_____

Acute Organ Injury in the First 14 Days Following ICU Admission

The questions below refer to the first 14 days following ICU admission. Even if the patient was in the ICU for less than 14 days and was transferred to the hospital floor, continue to enter data for the full 14 days or until discharged from the hospital (whichever occurs first)

Each of the acute organ injuries in this section is defined based on clinical suspicion by the treating provider(s)

Did ARDS occur within the first 14 days following ICU admission? ARDS defined as per chart review/progress notes	◯ Yes ◯ No
Date ARDS was first confirmed/suspected Do not enter any dates prior to ICU Day1; if ARDS started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
New congestive heart failure (CHF) in the first 14 days following ICU admission?	◯ Yes ◯ No ◯ N/A (CHF present at baseline)
Enter the left ventricular ejection fraction at the time of the new heart failure -Enter as an integer (0-100) and without % sign -If unavailable, enter, "N/A"	_____
Date CHF was first confirmed/suspected Do not enter any dates prior to ICU Day1; if CHF started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Arrhythmia during the first 14 days following ICU admission? Do not enter any dates prior to ICU Day1; if arrhythmia started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	☐ Atrial fibrillation/flutter ☐ Ventricular tachycardia (VT) ☐ Ventricular fibrillation ☐ None of the above
Sustained or non-sustained VT? Sustained is defined as requiring shocks or anti-arrhythmic therapy	◯ Sustained ◯ Non-sustained
Date atrial fibrillation/flutter first developed Do not enter any dates prior to ICU Day1; if atrial fibrillation/flutter started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____

Date VT first developed Do not enter any dates prior to ICU Day1; if VT started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Date ventricular fibrillation first developed Do not enter any dates prior to ICU Day1; if ventricular fibrillation started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
New myocarditis and/or pericarditis in the first 14 days following ICU admission? Defined as per chart review	◯ Myocarditis only ◯ Pericarditis only ◯ Both ◯ Neither
Date myocarditis or pericarditis first developed Do not enter any dates prior to ICU Day1; if myocarditis or pericarditis started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Cardiac arrest in the first 14 days following ICU admission?	◯ Yes ◯ No
Was CPR administered? *Some hospitals have prohibited CPR in COVID patients to protect healthcare workers	◯ Yes ◯ No because they were DNR ◯ No because of hospital policy*
Date of first cardiac arrest	_____
New infection in the first 14 days following ICU admission? Defined as a suspected or confirmed new infection other than COVID-19 that developed after admission to the ICU Should be primarily based on culture data (e.g., sputum, blood, urine, and stool), though other infections can also be included (e.g., cellulitis, abscess) if there was a strong clinical suspicion, even in the absence of positive cultures Do not enter any dates prior to ICU Day1; if the new infection started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	◯ Yes ◯ No

What infection(s)?	☐ Pneumonia (including ventilator-associated pneumonia) ☐ Urosepsis ☐ Biliary sepsis ☐ Bacteremia ☐ Other
Enter other infection	_____
Date pneumonia developed Do not enter any dates prior to ICU Day1; if pneumonia started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Date urosepsis developed Do not enter any dates prior to ICU Day1; if urosepsis started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Date biliary sepsis developed Do not enter any dates prior to ICU Day1; if biliary sepsis started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Date bacteremia developed Do not enter any dates prior to ICU Day1; if bacteremia started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Date other infection developed Do not enter any dates prior to ICU Day1; if other infection started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
New thromboembolic event in the first 14 days following ICU admission (select all that apply)	☐ Deep venous thrombosis (DVT) ☐ Pulmonary embolism (PE) ☐ Stroke ☐ Heparin-induced thrombocytopenia (H.I.T.) ☐ Other thromboembolic event ☐ None of the above
Enter other thromboembolic event	_____
Date of DVT Do not enter any dates prior to ICU Day1; if the DVT started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
DVT confirmed on diagnostic imaging (e.g., ultrasound)?	◯ Yes ◯ No

Location of the DVT (select all that apply) Lower extremity PROXIMAL refers to the thigh/knee (e.g., inferior vena cava, iliac, common femoral/superficial femoral/deep femoral, or popliteal veins) Lower extremity DISTAL refers to the calf (e.g., peroneal, tibial, gastrocnemius, soleal, calf perforator veins) Upper extremity or neck includes the internal jugular and subclavian veins Other includes abdominal vein thrombosis, cerebral venous sinus thrombosis, and others Superficial Veins (if in isolation, enter as "other thrombosis" not DVT) Great saphenous vein Small saphenous vein Reticular veins	☐ Lower extremity PROXIMAL ☐ Lower extremity DISTAL ☐ Upper extremity or neck ☐ Other
Date of Pulmonary Embolism (PE) Do not enter any dates prior to ICU Day1; if the PE started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Was the pulmonary embolism confirmed on imaging?	◯ Yes - by CT scan ◯ Yes - by V/Q scan (or other modality) ◯ No, the diagnosis was based on clinical suspicion only
What was the location of the pulmonary embolism?	◯ Proximal (lobar or segmental pulmonary vessels) ◯ Distal (subsegmental pulmonary vessels) ◯ Both proximal and distal
Date of stroke Do not enter any dates prior to ICU Day1; if the stroke started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Was the stroke confirmed on brain imaging?	◯ Yes ◯ No
Date HIT developed Do not enter any dates prior to ICU Day1; if the HIT started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date	_____
Thromboembolic event(s) in asssociation with HIT?	◯ Yes ◯ No
Enter the thromboembolic event(s) in asssociation with HIT?	_____

Date of other thromboembolic event
Do not enter any dates prior to ICU Day1; if the other thromboembolic event started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date

_____

New coagulopathy in the first 14 days following ICU admission
-Defined as INR>2 or PTT>40 in the absence of therapeutic anticoagulation
-If the patient was receiving therapeutic anticoagulation, select "no"

◯ Yes
◯ No

Date coagulopathy developed
Do not enter any dates prior to ICU Day1; if the coagulopathy started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date

_____

Peak PTT (seconds) in the absence of therapeutic anticoagulation
If none available, enter "N/A"

_____

Upper reference limit of normal for PTT (seconds) at your hospital's lab

_____

Peak INR in the absence of therapeutic anticoagulation
If none available, enter "N/A"

_____

New disseminated intravascular coagulation (DIC) in the first 14 days following ICU admission?

◯ Yes
◯ No

Date DIC developed
Do not enter any dates prior to ICU Day1; if the DIC started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date

_____

New major bleed in the first 14 days following ICU admission?
Defined as bleeding in a critical area or organ (e.g., intracranial, retroperitoneal, pericardial, or intramuscular bleeding with compartment syndrome) or bleeding requiring a procedural intervention (e.g., EGD or IR embolization). "Requiring" a procedural intervention could include situations where an intervention would regularly be performed, but was not actually performed because the patient was too unstable, or because of logistical/other concerns related to COVID-19.

Blood transfusion alone does not qualify as an intervention.

- ◯ Yes
- ◯ No

Date major bleed occurred
Do not enter any dates prior to ICU Day1; if the major bleed started prior to ICU Day1 and was still present on ICU Day1, enter the ICU Day1 date

_____

Did the major bleed occur in the presence of therapeutic anticoagulation?
Do not include DVT prophylaxis (e.g., unfractionated heparin 5,000 units SC or lovenox 30-40 mg SC)

- ◯ Yes
- ◯ No

Did the major bleed occur in the presence of prophylactic- or intermediate-dose anticoagulation received within 24 hours prior to the bleed?

Prophylactic dose anticoagulation includes subcutaneous unfractionated heparin, enoxaparin (LMWH) 30-40mg once daily, or dalteparin 5,000 units once daily
Intermediate-dose anticoagulation refers to enoxaparin (LMWH) 30-40 mg twice daily or dalteparin 5,000 units twice daily

- ◯ Yes - prophylactic dose anticoagulation
- ◯ Yes - intermediate-dose anticoagulation
- ◯ No

Did the major bleed occur in the presence of any of the following antiplatelet agents received within 24 hours prior to the bleed? (select all that apply)

- ☐ Aspirin
- ☐ Clopidogrel (Plavix)
- ☐ Prasugrel
- ☐ Ticagrelor
- ☐ Ticlopidine
- ☐ None

Location of major bleeding event(s) (select all that apply)

- ☐ Bronchopulmonary
- ☐ Pleural
- ☐ Pericardial
- ☐ Peritoneal
- ☐ Retroperitoneal
- ☐ Central nervous system
- ☐ Gastrointestinal
- ☐ Genitourinary
- ☐ Musculoskeletal and soft tissue
- ☐ Other

Enter the other location of the major bleed

_____

PT (seconds) within 24 hours prior to the major bleed
-If more than one value is avaiable within 24 hours prior to the bleed, use the value closest to and prior to the bleed
-If unavailable, enter, "N/A"

_____

PTT (seconds) within 24 hours prior to the major bleed
-If more than one value is avaiable within 24 hours prior to the bleed, use the value closest to and prior to the bleed
-If unavailable, enter, "N/A"

_____

INR within 24 hours prior to the major bleed
-If more than one value is avaiable within 24 hours prior to the bleed, use the value closest to and prior to the bleed
-If unavailable, enter, "N/A"

_____

Did the patient require transfusion of packed red blood cells (pRBCs) for the major bleed?
-Enter the total number of units of pRBCs received within 48 hours following the bleed
-If no pRBCs were transfused, enter "0"

_____

Was a procedure or invasive intervention required to stop the major bleed? (e.g., endoscopy, interventional radiology, or surgery)?

◯ Yes
◯ No

Was the major bleed clearly fatal, an important contributor to death, or a factor in the decision to withdraw care?

◯ Yes
◯ No

Additional Notes (if any)

_____

Medications and Clinical Trials

The questions below refer to the first 14 days following ICU admission. Even if the patient was in the ICU for less than 14 days and was transferred to the hospital floor, continue to enter data for the full 14 days or until discharged from the hospital (whichever occurs first)

Antibiotics, antivirals, and antimalarials received at any time within 14 days following ICU admission (check all that apply)
-Only include meds received as part of a clinical trial if the patient definitely received the med (e.g., if they were in an open-label trial of chloroquine, or even a randomized double-blind trial of chloroquine at dose X versus chloroquine at dose Y, select chloroquine; however, if the patient was in a randomized, double-blind study of chloroquine versus placebo, do not select chloroquine)

*This only refers to other antivirals, not other antibiotics. We are not collecting data on antibiotics other than the ones on the checklist (chloroquine, hydroxychloroquine, and azithromycin)

- ☐ Chloroquine
- ☐ Hydroxychloroquine
- ☐ Azithromycin
- ☐ Remdesivir
- ☐ Ribavirin
- ☐ Lopinavir/ritonavir (Kaletra)
- ☐ Other antiviral*
- ☐ None of the above

Enter the date chloroquine was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date hydroxychloroquine was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date azithromycin was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date remdesivir was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date ribavirin was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date lopinavir/ritonavir (Kaletra) was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the other antiviral

_____

Enter the date the other antiviral was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Anti-inflammatory medications received at any time within 14 days following ICU admission (check all that apply)
Include meds received as part of a clinical trial as long as the patient definitely received the med (i.e., do not include drug "X" if the patient was in a randomized, double-blind study of drug "X" versus placebo)

Do not include acetaminophen (Tylenol) as an "other anti-inflammatory" agent

- ☐ Corticosteroid
- ☐ NSAID
- ☐ Aspirin
- ☐ Statin
- ☐ Tocilizumab (Actemra)
- ☐ Other IL-6 antagonist
- ☐ Other anti-inflammatory
- ☐ Vitamin C (IV or PO)
- ☐ None of the above

Enter the name and initial cumulative daily dose of the corticosteroid
For example, if a patient was started on methylprednisolone 125mg twice per day, enter, "methylprednisolone 250 mg"

_____

Enter the date the corticosteroid was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the NSAID was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the aspirin was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the statin was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the tocilizumab was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the other IL-6 antagonist was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the other anti-inflammatory medication

_____

Enter the date the other anti-inflammatory medication was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the vitamin C was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

ARDS/hypoxemia-specific medications/interventions received at any time within 14 days following ICU admission (check all that apply)
*Includes cisatracurium (Nimbex) and others, but do not include short acting paralytics (e.g., rocuronium) used only for induction of intubation

- ☐ Neuromuscular blockade*
- ☐ Inhaled epoprostenol (Veletri or Flolan)
- ☐ Inhaled nitric oxide (iNO)
- ☐ Proned position
- ☐ None of the above

Enter the date the neuromuscular blockade was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date inhaled epoprostenol (Veletri or Flolan) was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the inhaled nitric oxide (iNO) was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the patient was first proned

_____

Other medications received at any time within 14 days following ICU admission (check all that apply)
Include meds received as part of a clinical trial as long as the patient definitely received the med

*ACE-Is include lisinopril, fosinopril, captopril, and others
*ARBs include losartan, valsartan, irbesartan, and others
**Systemic tPA only (does not apply to tPA infused into indwelling catheters or locally delivered intra-arterial tPA used for stroke)

- ☐ Convalescent serum
- ☐ ACE-I*
- ☐ ARB*
- ☐ tissue Plasminogen Activator (tPA)**
- ☐ None of the above

Enter the date the convalescent serum was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the ACE-I was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the ARB was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Enter the date the tPA was initiated
If initiated prior to ICU Day1, enter the date for ICU Day1

_____

Therapeutic anticoagulation received at any time within 14 days following ICU admission?
Do not include DVT prophylaxis (e.g., unfractionated heparin 5,000 units SC or lovenox 30-40 mg SC)

In patients receiving anticoagulation prior to ICU or hospital admission, continuation of this anticoagulation or conversion to an alternative therapeutic type means the answer to this question is, "Yes", and the date entered for anticoagultion initiation (for the following question) should be the date of ICU admission. Therapeutic anticoagulation includes any of the following categories:

1) Continuous drips (infusions) of heparin, argatroban, or bilvalirudin

2) Subcutaneous regimens:
Enoxaparin (Lovenox) 1mg/kg twice per day
Enoxaparin (Lovenox) 1.5mg/kg once per day
Dalteparin (Fragmin) 150-200 units/kg once per day
Dalteparin (Fragmin) 100 units/kg twice per day
Fondaparinux (Aristra) at doses of 5mg or more daily

3) Oral anticoagulants: warfarin (Coumadin), apixaban (Eliquis), rivaroxaban (Xarelto), edoxaban, or dabigatran (Pradaxa)

◯ Yes
◯ No

Anticoagulation type

☐ Heparin drip
☐ Therapeutic enoxaparin (Lovenox)
☐ Bivalirudin (Angiomax)
☐ Argatroban
☐ Other

Enter the date therapeutic anticoagulation was started
If already on therapeutic anticoagulation on arrival to the ICU, enter the date of ICU admission here

_____

Enter the indication(s) for anticoagulation (select all that apply)	☐ Atrial fibrillation/flutter ☐ Acute coronary syndrome/myocardial infarction ☐ DVT/PE ☐ For extracorporeal circuit (e.g., ECMO or RRT) ☐ Hypercoagulable state associated with COVID-19 ☐ Other
Enrolled in a clinical trial for COVID-19? Includes not only clinical trials of medications but any clinical trial, including devices or other interventions	◯ Yes ◯ No
Enter the ClinicalTrials.gov Identifier, if known (otherwise enter, "N/A") -The identifier always begins with "NCT", followed by several digits (e.g., NCT12345678). Enter the entire identifier, including the "NCT". The identifier can be easily found at the top of the ClinicalTrials.gov website for the trial -FYI, the ClinicalTrials.gov webpage for the trial is a good resource to answer the subsequent questions about study design	_____
Was the trial single-arm? One intervention only, with no active comparator group	◯ Yes ◯ No
What intervention did the patient receive? Be as specific as possible (e.g., drug X at X mg BID for X days)	_____
What intervention(s) did the patient receive? Or, if unknown, what interventions were being tested? -Be as specific as possible (e.g., drug X at X mg BID for X days versus drug Y; or drug X versus placebo) -Include details on study design, including whether the study was randomized, double-blinded, and placebo-controlled	_____
Was the patient enrolled in a second clinical trial?	◯ Yes ◯ No
Enter the details of the second clinical trial Include if the trial was single- versus double-arm, if it was randomized, double-blinded, and/or placebo-controlled, and what the intervention(s) were	_____
Additional notes (if any) Do not use this space to write about meds that were not asked about above	_____

Mortality and Length of Stay

Discharged from the ICU? -If the patient died in the ICU, select "no" -Enter the date the patient was first discharged from the ICU, even if they were subsequently readmitted back to the ICU	◯ Yes ◯ No ◯ N/A because the patient was in a non-ICU bed converted into an ICU bed for surge capacity, and these patients typically do not get transferred. They either die or are discharged home directly from the "non-ICU" bed
Date of discharge from the ICU	_____
Hospital mortality status	◯ Survived and discharged from the hospital ◯ Died during hospitalization ◯ Patient is still hospitalized at the time of data entry
Date of death	_____
Cause(s) of death (select all that apply)	☐ ARDS/respiratory failure ☐ Heart failure ☐ Septic shock ☐ Kidney failure ☐ Liver failure ☐ Other
Enter the other cause(s) of death -Do not simply write, "cardiopulmonary arrest" or "Comfort Measures Only". Rather, provide the immediate underlying cause(s) of death in addition to those already lised above (e.g., pulmonary embolism, stroke, etc.) -Would also mention here if the patient needed life-sustaining therapy (e.g., mechanical ventilation, RRT) but that it was unavailable due to shortages	_____
Date of last follow-up	_____
Date discharged from the hospital	_____
Additional Notes (if any) Do NOT use this space to write about the cause of death. Cause of death should be provided above. Also, do not provide details about DNR/DNI status, comfort measures only, family meetings, etc.	_____

Additional Lab Data

The questions below refer to the first 14 days following ICU admission. Even if the patient was in the ICU for less than 14 days and was transferred to the hospital floor, continue to enter data for the full 14 days or until discharged from the hospital (whichever occurs first)

Blood Type

◯ A+
◯ A-
◯ B+
◯ B-
◯ AB+
◯ AB-
◯ O+
◯ O-
◯ Unknown

Serum creatinine (mg/dl) on hospital discharge
If none available on the day of hospital discharge, enter the value closest to hospital discharge

_____

Dialysis-dependent on hospital discharge?

◯ Yes - from AKI
◯ Yes - from ESRD
◯ No

Did the patient have a kidney biopsy performed?

◯ Yes
◯ No

Copy and paste the entire biopsy report
Be sure to remove identifiers, like name and MRN

_____

Additional Data for ECMO Patients

This instrument is only meant for patients who initiated ECMO in the first 14 days following ICU admission. If the patient did not initiate ECMO in the first 14 days, no questions will appear below, and you may skip this section.

Was sodium bicarbonate administered intravenously (either as a drip or bolus infusion) within 24 hours prior to ECMO cannulation?
- ◯ Yes
- ◯ No

History of CNS dysfunction within 30 days prior to ECMO cannulation?
Defined as neurotrauma, stroke, encephalopathy/altered mental status, or seizure
- ◯ Yes
- ◯ No

Was peak inspiratory pressure on the ventilator ≥42 cm H2O at any time during the 48 hours prior to ECMO cannulation?
- ◯ Yes
- ◯ No

Select the mode of mechanical ventilation documented closest to, but no more than 24 hours prior to ECMO cannulation
- ◯ Volume control
- ◯ Pressure control
- ◯ SIMV
- ◯ APRV
- ◯ HFOV

Enter the tidal volume (mL) immediately prior to ECMO cannulation
_____

Enter the respiratory rate (per minute) immediately prior to ECMO cannulation
Enter the respiratory rate set on the mechanical ventilator, which not may not necessarily be the same as the patient's actual respiratory rate
_____

Enter the plateau pressure (cm H2O) immediately prior to ECMO cannulation
If not available, enter "N/A"
_____

What was the PCO2 on the arterial blood gas immediately prior to ECMO cannulation?
-Do not enter values from more than 24 hours prior to ECMO cannulation
-If none available, enter "N/A"
_____

Select the earliest documented mode of mechanical ventilation on postoperative day 1 after ECMO cannulation
Postoperative day 1 is defined as the next day (starting at midnight) after ECMO cannulation

- ◯ Volume control
- ◯ Pressure control
- ◯ SIMV
- ◯ APRV
- ◯ HFOV

Enter the earliest documented tidal volume (mL) on postoperative day 1 after ECMO cannulation
Postoperative day 1 is defined as the next day (starting at midnight) after ECMO cannulation

_____

Enter the earliest documented respiratory rate (per minute) on postoperative day 1 after ECMO cannulation
-Postoperative day 1 is defined as the next day (starting at midnight) after ECMO cannulation
-Enter the respiratory rate set on the mechanical ventilator, which not may not necessarily be the same as the patient's actual respiratory rate

_____

Enter the earliest documented plateau pressure (cm H2O) on postoperative day 1 after ECMO cannulation
-Postoperative day 1 is defined as the next day (starting at midnight) after ECMO cannulation
-If not available, enter "N/A"

_____

What was the PCO2 on the first arterial blood gas on postoperative day 1 after ECMO cannulation?
-Postoperative day 1 is defined as the next day (starting at midnight) after ECMO cannulation
-If none available, enter "N/A"

_____

Enter the earliest documented ECMO circuit blood flow (in liters per minute, LPM) on postoperative day 1 after ECMO cannulation
-Postoperative day 1 is defined as the next day (starting at midnight) after ECMO cannulation
-If not available, enter "N/A"

_____

Was the ECMO successfully decannulated (removed) during the first 28 days following ICU admission?
If the ECMO was decannulated for palliative purposes, select "no"

- ◯ Yes
- ◯ No

Date ECMO was decannulated

_____

Successfully liberated from ventilator? Defined as off the ventilator for at least 24 hours. If palliatively extubated, select "no"	◯ Yes ◯ No
Date liberated from ventilator	_____
Did the patient develop a pneumothorax requiring chest tube placement at anytime following ECMO cannulation?	◯ Yes ◯ No
Date of pneumothorax requiring chest tube placement	_____
New thromboembolic event in the 15-28 days following ICU admission (select all that apply) -Note, this question is limited to days 15-28 following ICU admission because the same question has already been asked on an earlier instrument for days 1-14	☐ Deep venous thrombosis (DVT) ☐ Pulmonary embolism (PE) ☐ Stroke ☐ Heparin-induced thrombocytopenia (H.I.T.) ☐ Other thromboembolic event ☐ None of the above
Date of DVT	_____
Date of pulmonary embolism	_____
Date of stroke	_____
Date of Heparin-induced thrombocytopenia (H.I.T.)	_____
Date of other thromboembolic event	_____
Enter the other thromboembolic event	_____

New major bleed in the first 15-28 days following ICU admission?
-Note, this question is limited to days 15-28 following ICU admission because the same question has already been asked on an earlier instrument for days 1-14.

Defined as bleeding in a critical area or organ (e.g., intracranial, retroperitoneal, pericardial, or intramuscular bleeding with compartment syndrome) or bleeding requiring a procedural intervention (e.g., EGD or IR embolization). "Requiring" a procedural intervention could include situations where an intervention would regularly be performed, but was not actually performed because the patient was too unstable, or because of logistical/other concerns related to COVID-19.

Blood transfusion alone does not qualify as an intervention.

- ◯ Yes
- ◯ No

Date major bleed occurred

_____

Location of major bleeding event(s) (select all that apply)

- ☐ Bronchopulmonary
- ☐ Pleural
- ☐ Pericardial
- ☐ Peritoneal
- ☐ Retroperitoneal
- ☐ Central nervous system
- ☐ Gastrointestinal
- ☐ Genitourinary
- ☐ Musculoskeletal and soft tissue
- ☐ Other

New infection on days 15 to 28 following ICU admission?
-Note, this question is limited to days 15-28 following ICU admission because the same question has already been asked on an earlier instrument for days 1-14.

Defined as a suspected or confirmed new infection other than COVID-19.

Should be primarily based on culture data (e.g., sputum, blood, urine, and stool), though other infections can also be included (e.g., cellulitis, abscess) if there was a strong clinical suspicion, even in the absence of positive cultures

- ◯ Yes
- ◯ No

Date new infection occurred

_____

What infection(s)?	☐ Pneumonia (including ventilator-associated pneumonia) ☐ Urosepsis ☐ Biliary sepsis ☐ Bacteremia ☐ Other
Requirement for new renal replacement therapy (dialysis) at any time on days 15-28 following ICU admission? -Note, this question is limited to days 15-28 following ICU admission because the same question has already been asked on an earlier instrument for days 1-14. -Only answer "yes" if the patient required new renal replacement therapy on any of days 15-28 and did NOT require it on days 1-14.	◯ Yes ◯ No
Date renal replacement therapy initiated	_____