

Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

Supplement to: Goyal P, Choi JJ, Pinheiro LC, et al. Clinical characteristics of Covid-19 in New York City. *N Engl J Med*. DOI: 10.1056/NEJMc2010419

Supplemental Appendix
Clinical Characteristics of COVID-19 in New York City

CONTENTS

Supplemental Methods	Page 2
Full Table	Page 3-10
Acknowledgements	Page 10

Methods

Data Sources

Data included demographics, clinical characteristics, comorbid conditions, symptoms, vital signs, laboratory values, and radiographic findings on presentation. Laboratory and radiographic testing were performed according to clinical care needs and analyzed/interpreted on site. First presenting vital signs and laboratory values within 48 hours of arrival to the Emergency Room (ER) were abstracted from the electronic health record. Vital signs included body temperature, heart rate, blood pressure, and respiratory rate. Laboratory values included complete blood count, metabolic panel, and inflammatory/injury markers including troponin, d-dimer, ferritin, erythrocyte sedimentation rate, C-reactive protein, and procalcitonin. Radiographic findings included results from the first chest radiograph obtained during the hospitalization.

Abstractors were clinicians and medical students trained to abstract standard data elements into REDCap. Training was performed in several hour-long sessions, led by a single investigator (JC). Calibration was reinforced through daily meetings and ongoing collaboration through remote shared communication platform. A 10% random sample was re-abstracted to ascertain agreement and monitor calibration. We calculated a Cohen's kappa for each variable collected via chart abstraction—the mean Cohen's kappa for categorical variables was 0.92 (IQR 0.86-0.97), and the mean Cohen's kappa for continuous variables was 0.94 (IQR 0.87-0.97). For laboratory values, we additionally cross-validated the manual abstraction process with an algorithm-based automated process of extracting labs from the electronic medical record—this revealed an agreement of 97%.

Study Outcomes

Hospital events included invasive mechanical ventilation, cardiovascular sequelae (myocardial infarction, atrial and ventricular arrhythmias, and heart failure), vasopressors or inotropes, mechanical circulatory support (MCS), viral co-infection, bacteremia, venous thromboembolic events, disseminated intravascular coagulation, rhabdomyolysis, new-onset renal replacement therapy, and death. Recovery included extubation and hospital discharge.

Study Definitions

Obesity was based on recorded height and weight and defined as body mass index ≥ 30 kg/m². Highest level of supplemental oxygen within three hours of presentation to the emergency room was determined based on review of emergency room respiratory flowsheets. Chest radiographic findings were abstracted from the final report and categorized into mutually exclusive categories of no parenchymal findings ("clear"), unilateral infiltrate, and bilateral infiltrates; the presence of pleural effusions was also abstracted. Viral co-infection was based on a positive respiratory viral panel. Complications including myocardial infarction, atrial and ventricular arrhythmias, heart failure, need for MCS, venous thromboembolic events, disseminated intravascular coagulation, rhabdomyolysis, and new onset renal replacement therapy were abstracted from clinical progress notes and/or discharge summaries based on mention or a description of such clinical events. Vasopressors included phenylephrine, norepinephrine, epinephrine, vasopressin, and dopamine. Inotropes included milrinone and

dobutamine. Death and discharge were determined from the disposition listed in the discharge note.

Table: Characteristics of 393 COVID-19 patients hospitalized at NewYork-Presbyterian Hospital’s Weill Cornell Medical Center and Lower Manhattan Hospitals, overall and by invasive mechanical ventilation.

	All		Invasive Mechanical Ventilation (N=130)	No Invasive Mechanical Ventilation (N=263)
	n/N with data available	Percent or median [IQR]	Number (percent) or median [IQR]	Number (percent) or median [IQR]
<i>Demographics and Clinical Characteristics on Admission</i>				
Median [IQR] age in years	393/393	62.2 [48.6, 73.7]	64.5 [51.7, 73.6]	61.5 [47.0, 75.0]
Male	238/393	60.6%	92 (70.8%)	146 (55.5%)
Race				
White	147/393	37.4%	46 (35.4%)	101 (38.4%)
Black	49/393	12.5%	15 (11.5%)	34 (12.9%)
Asian	67/393	17.0%	25 (19.2%)	42 (16.0%)

Other	80/393	20.4%	28 (21.5%)	52 (19.8%)
Not reported	50/393	12.7%	16 (12.3%)	34 (12.9%)
Health care worker	24/393	6.1%	8 (6.2%)	16 (6.1%)
Admitted from:				
Home	346/393	88.0%	118 (90.8%)	228 (86.7%)
Rehab/nursing home	24/393	6.1%	4 (3.1%)	20 (7.6%)
Other hospital	5/393	1.3%	4 (3.1%)	1 (0.4%)
Other/Undomiciled	18/393	4.6%	4 (3.1%)	14 (5.3%)
Smoking history				
Never smoked	295/393	75.1%	94 (72.3%)	201 (76.4%)
Former smoker	78/393	19.9%	30 (23.1%)	48 (18.3%)
Current smoker	20/393	5.1%	6 (4.6%)	14 (5.3%)
Obesity (BMI \geq 30 kg/m ²)	136/380	35.8%	56 (43.4%)	80 (31.9%)
Diabetes	99/393	25.2%	36 (27.7%)	63 (24.0%)
Hypertension	197/393	50.1%	70 (53.8%)	127 (48.3%)
Chronic obstructive pulmonary disease	20/393	5.1%	7 (5.4%)	13 (4.9%)
Asthma	49/393	12.5%	17 (13.1%)	32 (12.2%)

End stage renal disease	18/393	4.6%	2 (1.5%)	16 (6.1%)
Cirrhosis	6/393	1.5%	2 (1.5%)	4 (1.5%)
Coronary artery disease	54/393	13.7%	25 (19.2%)	29 (11.0%)
Heart failure	28/393	7.1%	6 (4.6%)	22 (8.4%)
Cancer _a	23/393	5.9%	10 (7.7%)	13 (4.9%)
HIV	7/393	1.8%	1 (0.8%)	6 (2.3%)
Other immunosuppressed state ^b	14/393	3.6%	5 (3.8%)	9 (3.4%)
Presenting Symptoms				
Fever	303/393	77.1%	100 (76.9%)	203 (77.2%)
Cough	312/393	79.4%	108 (83.1%)	204 (77.6%)
Diarrhea	93/393	23.7%	27 (20.8%)	66 (25.1%)
Nausea or vomiting	75/393	19.1%	22 (16.9%)	53 (20.2%)
Myalgias	107/393	27.2%	31 (23.8%)	76 (28.9%)
Dyspnea	222/393	56.5%	86 (66.2%)	136 (51.7%)
Median [IQR] days from symptom onset to admission	377/377	5.0 [3.0, 8.0]	6.0 [3.0, 8.0]	5.0 [2.0, 7.0]
Upon Arrival to Emergency Room				
Fever (>38° C)	100/392	25.5%	45 (34.6%)	55 (21.0%)

Heart rate \geq 125 beats per minute	22/393	5.6%	8 (6.2%)	14 (5.3%)
Systolic blood pressure <90 mm Hg	6/393	1.5%	2 (1.5%)	4 (1.5%)
Respiratory rate >24 breaths per minute	39/393	9.9%	28 (21.5%)	11 (4.2%)
Highest level of supplemental O ₂ required within first 3 hrs:				
None	244/393	62.1%	40 (30.8%)	204 (77.6%)
Nasal cannula	100/393	25.4%	54 (41.5%)	46 (17.5%)
Venti mask	3/393	0.8%	1 (0.8%)	2 (0.8%)
High flow nasal cannula	5/393	1.3%	3 (2.3%)	2 (0.8%)
Non-rebreather	19/393	4.8%	12 (9.2%)	7 (2.7%)
BIPAP or CPAP	3/393	0.8%	1 (0.8%)	2 (0.8%)
Invasive mechanical ventilation	19/393	4.8%	19 (14.6%)	0 (0.0%)
Initial Chest Radiography Findings				
Clear	65/393	16.5%	12 (9.2%)	53 (20.2%)
Unilateral infiltrate	61/393	15.5%	17 (13.1%)	44 (16.7%)
Bilateral infiltrates	235/393	59.8%	97 (74.6%)	138 (52.5%)
Pleural effusion	25/393	6.4%	10 (7.7%)	15 (5.7%)

Laboratory Findings				
WBC count >10,000 per mm ³	51/393	13.0%	36 (27.7%)	15 (5.7%)
WBC count <4,000 per mm ³	61/393	15.5%	12 (9.2%)	49 (18.6%)
Lymphocyte count <1500 per mm ³ , n (%)	351/390	90.0%	124 (95.4%)	227 (87.3%)
Median [IQR] hemoglobin in g/dL	393/393	13.6 [12.4, 15.0]	13.7 [12.3, 15.3]	13.5 [12.4, 14.8]
Platelet count <150,000 per mm ³	106/393	27.0%	34 (26.2%)	72 (27.4%)
Median [IQR] blood urea nitrogen, mg/dL	393/393	16.0 [12.0, 23.0]	16.0 [12.8, 28.0]	15.0 [11.0, 22.0]
Serum creatinine ≥1.5 mg/dL	63/393	16.0%	24 (18.5%)	39 (14.8%)
Median [IQR] serum glucose, mg/dL	393/393	112 [98, 148]	126 [107, 167]	108 [95, 134]
Median [IQR] serum albumin g/dL	375/375	3.6 [3.1, 3.9]	3.3 [3.0, 3.8]	3.7 [3.3, 4.0]
Alanine aminotransferase >40 U/L	120/375	32.0%	48 (37.5%)	72 (29.1%)
Aspartate aminotransferase >40 U/L	173/372	46.5%	80 (63.0%)	93 (38.0%)
Total bilirubin >17.1 umol/L	34/375	9.1%	18 (14.1%)	16 (6.5%)
Troponin >0.5 ng/mL	11/246	4.5%	9 (9.6%)	2 (1.3%)
D-Dimer >0.5 mg/L	44/121	36.4%	23 (43.4%)	21 (30.8%)

Ferritin >300 ug/mL	94/142	66.2%	49 (87.5%)	45 (52.3%)
Median [IQR] erythrocyte sedimentation rate in mm/hr	145/145	51.0 [26.0, 79.0]	59.0 [33.0, 80.0]	50.0 [21.0, 74.0]
C-Reactive protein >10 mg/dL	97/223	43.5%	59 (64.1%)	38 (29.0%)
Procalcitonin \geq 0.5 ng/mL	56/331	16.9%	31 (25.0%)	25 (12.1%)
<i>In-Hospital Treatment</i>				
Hydroxychloroquine	250/393	63.6%	127 (97.7%)	123 (46.8%)
Remdesivir	17/393	4.3%	6 (4.6%)	11 (4.2%)
Oral corticosteroids	46/393	11.7%	32 (24.6%)	14 (5.3%)
<i>In-Hospital Complications</i>				
Median [IQR] days from admission to intubation	130/130	1.0 [0.0, 3.0]	--	--
Myocardial infarction	14/393	3.6%	11 (8.4%)	3 (1.1%)
Atrial arrhythmia	28/393	7.1%	23 (17.7%)	5 (1.9%)
Ventricular arrhythmia	1/393	0.3%	1 (0.8%)	0 (0.0%)
Heart failure ^c	7/393	1.8%	3 (2.3%)	4 (1.5%)
Need for vasopressor	128/393	32.6%	124 (95.4)	4 (1.5%)
Need for inotrope	5/393	1.3%	3 (2.3%)	2 (0.8%)

Need for MCS	0/393	0%	0	0
Bacteremia	19/338	4.8%	15 (11.9%)	4 (1.8%)
Viral co-infection	4/393	1.0%	2 (1.5%)	2 (0.8%)
Venous thromboembolic event	13/393	3.3%	10 (7.7%)	3 (1.1%)
Disseminated intravascular coagulation	2/393	0.5%	2 (1.5%)	0 (0%)
Rhabdomyolysis	4/393	1.0%	3 (2.3%)	1 (0.4%)
New onset renal replacement therapy	18/375	4.8%	17 (13.3%)	1 (0.4%)
Deaths	40/393	10.2%	19 (14.6%)	21 (8.0%)
Recovery				
Extubated	43/130	33.1%	--	--
Discharged from hospital	260/393	66.2%	23 (17.7%)	237 (90.1%)

Abbreviations: BIPAP = Bilevel positive airway pressure. BMI = Body mass index. COPD = Chronic obstructive pulmonary disease. CPAP = Continuous positive airway pressure. HIV= Human Immunodeficiency Virus. IQR = Interquartile range. MCS = Mechanical circulatory support. WBC = White blood cell.

^a Cancer excludes non-melanoma skin cancer.

^b Other immunosuppressed state includes chemotherapy or radiotherapy within last 6 months; or inherited immunodeficiency.

^c Rates may be underestimated, since echocardiograms were performed on a limited number of patients

ACKNOWLEDGEMENTS:

The authors would like to formally acknowledge our chart abstractors, which included a team of Weill Cornell Medicine medical students and NewYork-Presbyterian/Weill Cornell Medical Center housestaff.