

# Characteristics and Outcomes of COVID-19 Patients Admitted to a Regional Health System in the Southeast

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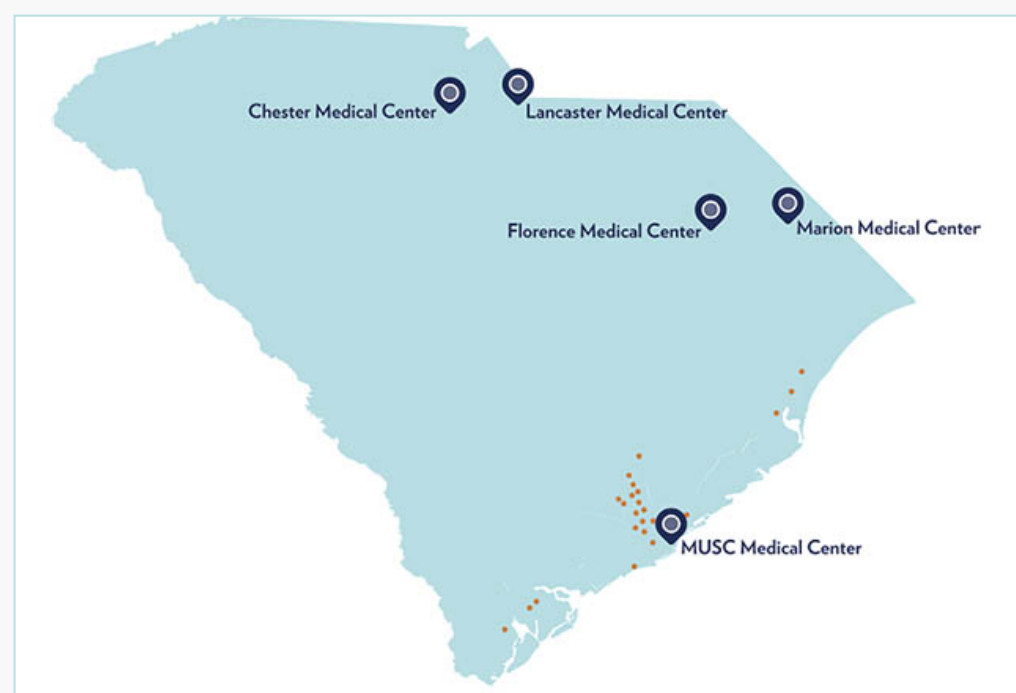
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## INTRODUCTION

- We describe a cohort of patients admitted to an academic health system in the southeast where demographics and comorbidities differ significantly from other areas of the United States.

## METHODS

- MUSC Health is comprised of a large urban academic medical center and four regional hospitals in South Carolina.



- This was a retrospective review of 161 consecutive patients with confirmed COVID-19 admitted to MUSC Health from 3/12/20-6/1/20.
- We assessed demographics, comorbidities, presenting signs and symptoms, treatments, and outcomes.
- We compared these variables between patients who died during hospitalization and those who survived to discharge.

## Demographics

- The mean age of the entire cohort was 60.5 years.
- The majority of the cohort was African American (AA) (72%) and admitted from home (69.6%).
- AA comprised a disproportionate share (72%) of our cohort compared to the general population of our state (30%), those tested in our region (32.9%), and those found to be positive for COVID-19 (35.8%).
- There were no significant differences between survivors and non-survivors in race, healthcare worker status, location from which they were admitted, travel history, and COVID exposure history.
- Older age and male sex were associated with increased risk of death during COVID hospitalization.

|                  | Survivors (n=130) | Non-survivors (n=31) | OR [95%CI]       | P-value |
|------------------|-------------------|----------------------|------------------|---------|
| Mean age (years) | 57.6 (0.02-94.7)  | 72.5 (0.02-102.9)    | 1.06 [1.02-1.09] | 0.0004  |
| Female           | 72 (55.4%)        | 11 (35.5%)           | 0.44 [0.20-0.99] | 0.0500  |

## Comorbidities

- The entire cohort had high rates of obesity (54.5%), hypertension (72%), diabetes (47.2%), and COPD/asthma (33.6%).
- In-hospital mortality was significantly associated with comorbid hypertension, end-stage renal disease (ESRD) on hemodialysis (HD), and cancer.
- There was no difference in pre-existing respiratory (COPD, asthma, smoking) or cardiac conditions (CAD, heart failure).

|                          | Survivors (n=130) | Non-survivors (n=31) | OR [95%CI]        | P-value |
|--------------------------|-------------------|----------------------|-------------------|---------|
| Current or former smoker | 38 (29.3%)        | 11 (35.5%)           | NS                | NS      |
| Obese (BMI>30)           | 68 (52.3%)        | 17 (54.8%)           | NS                | NS      |
| Diabetes                 | 57 (43.8%)        | 19 (61.3%)           | NS                | NS      |
| HTN                      | 90 (69.2%)        | 26 (83.9%)           | 2.88 [1.04-7.99]  | 0.030   |
| COPD                     | 26 (20%)          | 5 (16.1%)            | NS                | NS      |
| Asthma                   | 19 (14.6%)        | 4 (12.9%)            | NS                | NS      |
| ESRD on HD               | 11 (8.5%)         | 8 (25.8%)            | 3.76 [1.36-10.38] | 0.007   |
| Liver disease            | 3 (2.3%)          | 0                    | NS                | NS      |
| CAD                      | 21 (16.2%)        | 8 (25.8%)            | NS                | NS      |
| Heart failure            | 17 (13.1%)        | 6 (19.4%)            | NS                | NS      |
| Neurologic disease       | 27 (20.8%)        | 7 (22.6%)            | NS                | NS      |
| Cancer                   | 11 (8.5%)         | 7 (22.6%)            | 3.16 [1.11-8.96]  | 0.030   |
| Other immunosuppression  | 16 (12.3%)        | 4 (12.9%)            | NS                | NS      |

## Labs and Radiology

- There were no differences in CXR findings (clear, unilateral vs. bilateral infiltrates, pleural effusions), WBC count, absolute lymphocyte count, liver function tests, C-reactive protein, or troponin levels between survivors and non-survivors.
- Non-survivors were more likely to have renal dysfunction and elevated ferritin levels.

|               | Survivors (n=130) | Non-survivors (n=31) | OR [95%CI]             | P-value |
|---------------|-------------------|----------------------|------------------------|---------|
| Mean BUN      | 23.4              | 35.7                 | 1.03 [1.01-1.04]       | 0.004   |
| Mean Cr       | 2.0               | 3.9                  | 1.12 [1.02-1.24]       | 0.020   |
| Mean ferritin | 912               | 1835                 | 1.0003 [1.0001-1.0006] | 0.020   |

## RESULTS

### Presenting Signs and Symptoms

- The majority of the cohort presented with fever (>38.0) (68.8%) and required supplemental oxygen within 8 hours of admission (63.4%).
- Cough (65.6%), dyspnea (57.5%), myalgias (30.6%), and diarrhea (23.8%) were also common presenting symptoms.
- Patients who died were statistically less likely to have cough and myalgias and more likely to be tachypneic and require supplemental oxygen within 8 hours of admission.

|   | Survivors (n=130) | Non-survivors (n=31) | OR [95%CI]        | P-value |
|---|-------------------|----------------------|-------------------|---------|
| Fever >38.0                             | 85 (65.4%)        | 25 (80.6%)           | NS                | NS      |
| Subjective fever                        | 84 (64.6%)        | 17 (54.8%)           | NS                | NS      |
| Anosmia/Ageusia                         | 12 (9.2%)         | 1 (3.2%)             | NS                | NS      |
| Chills                                  | 49 (37.7%)        | 10 (32.3%)           | NS                | NS      |
| Cough                                   | 91 (70%)          | 14 (45.2%)           | 0.35 [0.16-0.79]  | 0.009   |
| Rhinorrhea                              | 18 (13.8%)        | 5 (16.1%)            | NS                | NS      |
| Sore throat                             | 8 (6.2%)          | 2 (6.5%)             | NS                | NS      |
| Diarrhea                                | 31 (23.8%)        | 7 (22.6%)            | NS                | NS      |
| Nausea or vomiting                      | 19 (14.6%)        | 7 (22.6%)            | NS                | NS      |
| Myalgias                                | 45 (34.6%)        | 4 (12.9%)            | 0.28 [0.09-0.85]  | 0.020   |
| Dyspnea                                 | 75 (57.7%)        | 17 (54.8%)           | NS                | NS      |
| Chest pain                              | 22 (16.9%)        | 0                    | NS                | NS      |
| Headache                                | 23 (17.7%)        | 0                    | NS                | NS      |
| Abdominal pain                          | 14 (10.8%)        | 4 (12.9%)            | NS                | NS      |
| Previous admission for COVID-19         | 2 (1.5%)          | 3 (9.7%)             | 6.86 [1.09-42.97] | 0.020   |
| Mean RR                                 | 20 (25.4% >20)    | 22 (48.4% >20)       | 2.76 [1.23-6.18]  | 0.010   |
| Need for supplemental O2 within 8 hours | 75 (57.7%)        | 26 (83.9%)           | 3.81 [1.38-10.56] | 0.007   |

### Treatments

- Non-survivors were more likely to receive steroids, require ICU care, intubation, vasopressors, and inotropes.
- Use of hydroxychloroquine, antibiotics, remdesivir, immunomodulators, convalescent plasma, and IVIG did not differ between groups.

|                         | Survivors (n=130) | Non-survivors (n=31) | OR [95%CI]          | P-value |
|-------------------------|-------------------|----------------------|---------------------|---------|
| Steroids                | 22 (16.9%)        | 16 (51.6%)           | 5.24 [2.26-12.14]   | <0.0001 |
| ICU care                | 38 (29.2%)        | 31 (100%)            | 72.63 [9.56-552.89] | <0.0001 |
| Intubation              | 18 (13.8%)        | 26 (83.9%)           | 32.36 [11.0-95.16]  | <0.0001 |
| Mean days to intubation | 2 (0-7)           | 5.7 (0-22)           | 1.34 [1.02-1.75]    | 0.03    |
| Mean days on ventilator | 18.5 (3-53)       | 11.9 (1-36)          | NS                  | NS      |
| Vasopressors            | 14 (10.8%)        | 22 (71%)             | 20.25 [7.81-52.5]   | <0.0001 |
| Inotropes               | 2 (1.5%)          | 4 (12.9%)            | 9.48 [1.65-54.42]   | 0.003   |

### Complications/Outcomes

- Several complications were significantly associated with death including arrhythmia, HAI, ARDS, VTE, and renal failure requiring HD.

|                    | Survivors (n=130) | Non-survivors (n=31) | OR [95%CI]         | P-value |
|--------------------|-------------------|----------------------|--------------------|---------|
| New MI             | 8 (6.2%)          | 4 (12.9%)            | NS                 | NS      |
| New arrhythmia     | 9 (6.9%)          | 12 (38.7%)           | 8.49 [3.15-22.86]  | 0.0001  |
| New heart failure  | 3 (2.3%)          | 3 (9.7%)             | NS                 | NS      |
| Bacteremia         | 2 (1.5%)          | 3 (9.7%)             | 6.86 [1.09-42.98]  | 0.02    |
| Pneumonia          | 48 (36.9%)        | 19 (61.3%)           | 2.70 [1.21-6.05]   | 0.01    |
| ARDS               | 19 (14.6%)        | 18 (58.1%)           | 8.09 [3.41-19.18]  | 0.0001  |
| VTE                | 6 (4.6%)          | 5 (16.1%)            | 3.97 [1.13-14.01]  | 0.02    |
| New HD requirement | 4 (3.1%)          | 11 (35.5%)           | 17.33 [5.03-59.74] | 0.0001  |
| Mean LOS (days)    | 11.1 (1-55)       | 16.7 (1-34)          | 1.04 [1.01-1.08]   | 0.01    |

## CONCLUSION

COVID-19 patients admitted to our southeastern health system had significant comorbidities, most commonly obesity, HTN, and diabetes and AA were disproportionately represented. In-hospital mortality was 19.3% and intubation, particularly if delayed, was associated with death as were several complications, most notably arrhythmia, ARDS, and renal failure with HD.