Results: Of 259 patients, 166 (64%) had non-severe disease, and 93 (36%) severe disease; median age [IQR] was 62 [51,73]. There were 138 (53%) males and 75 (29%) Hispanics. Among non-Hispanics, 124 (48%) were White, 198 (77%) African Americans, and 12 (5%) other races. Sixty (23%) were admitted from a nursing facility, 52 (20%) from community, and 12 (5%) other. The in-hospital mortality rate was 15% (38/259). Severe COVID-19 was associated with older age (p=0.02), admission from nursing facility (p=0.009), increased BMI (p=0.002), diabetes mellitus (p=0.002), and COPD (p=0.03). At the time of presentation, severe COVID-19 was associated with tachypnea, hypoxia, increased BMI (p=0.03), diabetes mellitus (p=0.0002), and COPD (p=0.03). At the time of presentation, severe COVID-19 was associated with tachypnea, hypoxia, increased BMI (p=0.03), diabetes mellitus (p=0.0002), and COPD (p=0.03).

Table 1: Demographics

|                | All patients (n=259) | Non-severe (n=196%) | Severe group (n=63%) | p-value |
|----------------|----------------------|---------------------|----------------------|---------|
| Age (years)    | 62[51,73]            | 61[49,72]           | 65[62,74]           | 0.0254  |
| Gender         |                      |                     |                      |         |
| Male           | 138                  | 96[63,5]            | 42[62,7]            |         |
| Female         | 121                  | 99[64,6]            | 43[64,6]            |         |
| Race/Ethnicity |                      |                     |                      |         |
| Black          | 48                   | 34                  | 14                   | 0.5221  |
| White          | 210                  | 164                 | 46                   |         |
| Asian          | 1                     | 1                   | 0                    |         |
| Other          | 0                    | 0                   | 0                    |         |
| Health care worker | 37                  | 27                  | 10                   | 0.0057  |

Table 2: Medical comorbidities

|                     | All patients (n=259) | Non-severe (n=196%) | Severe group (n=63%) | p-value |
|---------------------|----------------------|---------------------|----------------------|---------|
| Smoking (ever)      | 93                   | 90                  | 3                   | 0.8700  |
| Median BMI [IQR]    | 30[26,34]            | 29[25,34]           | 30[27,35]           | 0.0347  |
| BMI>30 kg/m²        | 114                  | 110                 | 4                   | 0.0652  |
| Hypertension        | 164                  | 161                 | 3                   | 0.1095  |
| Diabetes mellitus   | 100                   | 96                  | 4                   | 0.0003  |
| Pre-diabetes        | 38                   | 38                  | 0                   | 0.3330  |
| Hypertension        | 134                  | 132                 | 2                   | 0.0233  |
| Coronary artery disease | 20               | 18                  | 2                   | 0.3330  |
| Peripheral vascular disease | 10           | 9                   | 1                   | 0.4340  |
| COPD                | 25                   | 25                  | 0                   | 0.0276  |
| Asthma              | 30                   | 26                  | 4                   | 0.7456  |
| Chronic kidney disease | 46                | 44                  | 2                   | 0.4001  |
| Congestive heart failure | 37               | 37                  | 0                   | 0.1692  |
| Chronic liver disease | 16                  | 14                  | 2                   | 0.6685  |
| Neurological diseases | 30                | 30                  | 0                   | 0.2026  |
| Autonomic disease   | 10                   | 10                  | 0                   | 0.2849  |
| Organ transplant     | 10                   | 9                   | 1                   | 0.4050  |
| HIV                 | 5                    | 5                   | 0                   | 0.0050  |
| Malignancy          | 29                   | 18                  | 11                  | 0.8905  |
| Immunosuppression secondary to medications | 25 | 22 | 3 | 0.1848 |

Table 3: Presenting symptoms and signs in the first 24 hours of admission

| Symptom                  | All patients (n=259) | Non-severe (n=196%) | Severe group (n=63%) | p-value |
|--------------------------|----------------------|---------------------|----------------------|---------|
| Complaint                | 127                  | 116                 | 11                   | 0.2331  |
| Respiratory symptoms     | 223                  | 185                 | 38                   | 0.0051  |
| Cardiovascular symptoms  | 208                  | 134                 | 72                   | 0.9879  |
| Objective                |                      |                     |                      |         |
| Fever                    | 155                  | 136                 | 19                   | 0.2846  |
| Hypothermia              | 30                   | 26                  | 4                   | 0.0651  |
| Tachycardia              | 138                  | 120                 | 18                   | 0.1573  |
| Tachypnea                | 191                  | 172                 | 19                   | 0.0004  |
| Hypertension             | 209                  | 169                 | 40                   | 0.0004  |
| Hypotension              | 44                   | 34                  | 10                   | 0.0004  |

Table 4: Basic labs in the first 24 hours

| Lab Parameter            | All patients (n=259) | Non-severe (n=196%) | Severe group (n=63%) | p-value |
|--------------------------|----------------------|---------------------|----------------------|---------|
| Lactate                  | 9                   | 9                   | 0                   | 0.1157  |
| Leukopenia               | 25                   | 14                  | 11                  | 0.0186  |
| Normal WBC               | 159                  | 141                 | 18                  | 0.0008  |
| Hematocrit               | 40                   | 32                  | 8                   | 0.0005  |
| T-diff                   | 36                   | 33                  | 3                   | 0.0008  |
| ALT                      | 51                   | 42                  | 9                   | 0.0278  |
| AST                      | 15                   | 12                  | 3                   | 0.0004  |

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of viral resistance to therapeutic interventions and immune pressure. The goal of this study was to assess the change in viral load and viral genome sequence within patients over time and determine if these changes correlate with clinical and/or demographic parameters.

**Methods:** Hospitalized patients admitted to Northwestern Memorial Hospital with a positive SARS-CoV-2 test were enrolled in a longitudinal study for the serial collection of nasopharyngeal specimens. Swabs were administered to patients by hospital staff every 4 ± 1 days for up to 32 days or until the patients were discharged. RNA was extracted from each specimen and viral loads were calculated by quantitative reverse transcriptase PCR (qRT-PCR). Specimens with qRT-PCR cycle threshold values less than or equal to 30 were subject to whole viral genome sequencing by reverse transcription, multiplex PCR, and deep sequencing. Variant populations sizes were estimated and subject to phylogenetic analysis relative to publicly available SARS-CoV-2 sequences. Sequence and viral load data were subsequently correlated to available demographic and clinical data.

**Results:** 60 patients were enrolled from March 26th to June 20th, 2020. We observed a greater decrease in nasopharyngeal viral load over time across all patients. However, the temporal dynamics of viral load differed on a patient-by-patient basis. Several mutations were also observed to have emerged within patients over time.

Distribution of SARS-CoV-2 viral loads in serially collected nasopharyngeal swabs in hospitalized adults as determined by qRT-PCR. Samples were collected every 4 ± 1 days (T1–8) and viral load is displayed by log(copy number).

**Conclusion:** These data indicate that SARS-CoV-2 viral loads in the nasopharynx decrease over time and that the virus can accumulate mutations during replication within individual patients. Future studies will examine if some of these mutations may provide fitness advantages in the presence of therapeutic and/or immune selective pressures.

**Disclosures:** Michael G. Ison, MD MS, AlloVir (Consultant)

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**Figure 1**

**Figure 1** Heatmap of the significance level in each gene set of interest including COVID-19 vs HC (+) and (-), non-COVID-19 viral vs HC (+) and (-), and COVID-19 vs non-COVID-19 viral (+) and (-) and combinations of the interest of COVID-1 vs HC with non-COVID-19 viral. Scale in heatmap is from 1 to 10 for the significance level.