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Abstract

Background: The COVID-19 pandemic has caused substantial morbidity and mortality.

Objectives: To describe monthly demographic and clinical trends among adults hospitalized with COVID-19.

Design: Pooled cross-sectional.

Setting: 99 counties within 14 states participating in the Coronavirus Disease 2019-Associated Hospitalization Surveillance Network (COVID-NET).

Patients: U.S. adults (aged ≥18 years) hospitalized with laboratory-confirmed COVID-19 during March 1-December 31, 2020.

Measurements: Monthly trends in weighted percentages of interventions and outcomes including length of stay (LOS), intensive care unit admissions (ICU), invasive mechanical ventilation (IMV), vasopressor use and in-hospital death (death). Monthly hospitalization, ICU and death rates per 100,000 population.

Results: Among 116,743 hospitalized adults, median age was 62 years. Among 18,508 sampled adults, median LOS decreased from 6.4 (March) to 4.6 days (December). Remdesivir and systemic corticosteroid use increased from 1.7% and 18.9% (March) to 53.8% and 74.2% (December), respectively. Frequency of ICU decreased from 37.8% (March) to 20.5% (December). IMV (27.8% to 8.7%), vasopressors (22.7% to 8.8%) and deaths (13.9% to 8.7%) decreased from March to October; however, percentages of these interventions and outcomes remained stable or increased in November and December. Percentage of deaths significantly decreased over time for non-Hispanic White patients (p-value <0.01) but not non-Hispanic Black or Hispanic patients. Rates of hospitalization (105.3 per 100,000), ICU (20.2) and death (11.7) were highest during December.

Limitations: COVID-NET covers approximately 10% of the U.S. population; findings may not be generalizable to the entire country.

Conclusions: After initial improvement during April-October 2020, trends in interventions and outcomes worsened during November-December, corresponding with the 3rd peak of the U.S. pandemic. These data provide a longitudinal assessment of trends in COVID-19-associated outcomes prior to widespread COVID-19 vaccine implementation.

Introduction

The Centers for Disease Control and Prevention (CDC) estimates that 83.1 million total infections, 70.4 million symptomatic illnesses and 4.1 million hospitalizations associated with coronavirus disease 2019 (COVID-19) occurred in the United States as of December 2020 (1, 2). The clinical epidemiology of COVID-19 among U.S. adults has been well described, with older age and underlying conditions identified as risk factors for COVID-19-associated hospitalization and mortality (3-10). However, data on trends in clinical characteristics and outcomes of COVID-19-associated hospitalizations (11-16) are limited, and few studies to date include data from the 3rd peak of the U.S. pandemic. CDC's Coronavirus Disease 2019-Associated Hospitalization Surveillance Network (COVID-NET) (17) has shown that 25% of COVID-19-associated hospitalizations during March-December 2020 required intensive care unit (ICU) admission, 14% received invasive mechanical ventilation, and 11% died in-hospital (COVID-19 Hospitalizations (cdc.gov)). However, cumulative data do not describe changing trends over time, which may be impacted by changes in COVID-19 epidemiology (18), implementation of mitigation measures (19, 20), evolving COVID-19 treatments (21-24), and knowledge, experience and capacity of healthcare providers and systems caring for hospitalized patients with COVID-19 (12, 14-16). Using COVID-NET data, we described monthly trends in clinical characteristics, interventions and outcomes among adults hospitalized with COVID-19 during March–December 2020, prior to the large-scale availability of COVID-19 vaccines.

Methods

COVID-NET conducts population-based surveillance for laboratory-confirmed COVID-19–associated hospitalizations among persons of all ages in 99 counties in 14 states participating in the Emerging Infections Program (California, Colorado, Connecticut, Georgia, Maryland, Minnesota, New Mexico, New York, Oregon, Tennessee) and the Influenza Hospitalization Surveillance Project (Iowa, Michigan, Ohio, Utah). COVID-NET covers a catchment population of approximately 32 million persons (~10% of the U.S. population) and collects data from over 250 acute care hospitals (17). Hospitalized patients who are residents of the surveillance catchment area and have SARS-CoV-2 detected by positive molecular or rapid antigen testing during hospitalization or within 14 days before admission are included in COVID-NET. SARS-CoV-2 testing is performed at the discretion of health care providers or according to hospital testing policies.

A minimum set of data are collected on all identified cases to produce weekly hospitalization rates (COVID-19 Hospitalizations (cdc.gov)). Incidence rates are calculated using the National Center for Health Statistics' vintage 2019 bridge-race postcensal population estimates for the counties included in surveillance (25). Detailed clinical data are collected for a random sample of cases aged ≥18 years stratified by age and surveillance site. Random numbers are auto generated and assigned to each case upon entry into the surveillance database. Trained surveillance staff conduct medical chart abstractions using a standardized case report form.

Data on race and ethnicity were categorized as follows: non-Hispanic White (White), non-Hispanic Black (Black), Hispanic or Latino (Hispanic), non-Hispanic Asian or Pacific Islander (Asian/PI), non-Hispanic American Indian or Alaska Native (AI/AN) and people of more than one race/ethnicity. If ethnicity was unknown (3.8% of cases), non-Hispanic ethnicity was assumed. Facility residence at admission was defined as residence in rehabilitation facilities, assisted living/residential care, group homes, nursing homes, skilled nursing facilities, long-term care facilities, long term acute care hospitals, alcohol/drug treatment centers, and psychiatric facilities. Healthcare workers were defined as all paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or infectious materials. Patients were defined as having 0, 1, 2, or ≥3 underlying condition categories rather than individual conditions as follows: chronic lung disease (including asthma), chronic metabolic disease (including diabetes mellitus), cardiovascular disease (excluding hypertension), blood disorders, neurologic disorders, immunosuppressive conditions, chronic renal disease, rheumatologic/autoimmune conditions, hypertension, obesity (defined as body mass index ≥30 kg/m^2), feeding-tube dependent, ventilator-dependent and wheel-chair-dependent. Any medication prescribed for treatment of SARS-CoV-2, including investigational agents or treatment through a clinical trial, was classified as a COVID-19–associated treatment. Invasive mechanical ventilation, bilevel positive airway pressure (BiPAP), continuous positive airway pressure (CPAP), and high-flow nasal cannula (HFNC) were defined based on the highest level of respiratory support received. Vasopressor use was included only if administered as a continuous infusion. Renal replacement therapy (RRT) during hospitalization was described regardless of whether a patient received RRT prior to hospitalization. Discharge disposition was collected, including whether a patient was discharged from the hospital or died in-hospital.

Data from all cases aged ≥18 years and hospitalized with COVID-19 during March 1–December 31, 2020 were used to describe patient demographics and hospitalization rates. All other analyses were limited to sampled adult patients hospitalized with COVID-19 for whom medical chart abstractions were completed and a discharge disposition was known; weights were applied to reflect the probability of being sampled for medical chart abstraction. Sample sizes were generated to allow for monthly estimation of the prevalence of clinical parameters by 3 adult age groups (18-49 years, 50-64 years and ≥65 years), and separately by 3 racial/ethnic groups (White, Black and Hispanic persons). Due to small sample sizes, we were unable to generate monthly estimates for other racial/ethnic groups. Sample sizes were generated to produce relative standard errors (RSE) <0.3 for clinical parameters with prevalence estimates ≥10% (all estimates with RSE >0.3 are noted in supplemental tables). Descriptive statistics were generated overall and by month from March through December 2020. To produce robust prevalence estimates stratified by both age and race/ethnicity, data from multiple months were combined (i.e., March-May, June-September, October-December). For all analyses using sampled data, weighted percentages and unweighted case counts are presented. Logistic regression models (for all binary measures) were used to test the statistical significance of monthly trends by assigning MMWR month (or groups of months as indicated) as a single

continuous predictor in models for all ages combined and for each individual age group strata or age by race strata. The models assumed overall linear effects for outcomes measured. Median length of stay (LOS) (for patients who were discharged alive or died in-hospital) and days from symptom onset to admission were compared across months using the Mann-Whitney-U test. P-values <0.05 were considered statistically significant. We calculated unadjusted hospitalization incidence rates per 100,000 population by taking the total number of cases each month overall and within each age group, divided by the National Center for Health Statistics' vintage 2019 bridge-race postcensal population estimates for the counties included in surveillance. Incidence rates for ICU admissions and deaths among hospitalized patients were calculated similarly, instead using weighted numbers of sampled cases as the numerators. Taylor series linearization method was used for variance estimation. All analyses were conducted using SAS 9.4 software (SAS Institute Inc., Cary, NC).

This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy (see e.g., 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. §241(d); 5 U.S.C. §552a; 44 U.S.C. §3501 et seq.) Sites participating in COVID-NET obtained approval from their respective state and local Institutional Review Boards, as applicable.

Results

Hospitalization Rates and Demographic Characteristics of all Adults

During March 1–December 31, 2020, among adults aged ≥18 years, hospitalization rates ranged from 20.2 per 100,000 population (March) to 105.3 (December); rates were highest among adults aged ≥65 years, ranging from 45.4 (March) to 293.8 (December) (Supplemental Table 1). Among the 116,743 adult cases, 26.4% were 18-49 years, 27.7% were 50-64 years and 46.0% were ≥65 years of age. The median age was 62.0 years (IQR 48.1-74.6); while the median age initially decreased from 60.9 years in March to 55.6 years in June, it increased in subsequent months to 65.4 years in December (Table 1). Overall, 50.7 % of cases were male with minimal variation in sex distribution over time; 40.8% of cases were White, 26.9% were Black, and 20.0% were Hispanic.

Clinical Characteristics and COVID-19-Associated Treatments among a Sample of Adults

Chart reviews were completed, and discharge dispositions ascertained on a sample of 18,508 adult hospitalized cases. Overall, demographic characteristics of sampled cases were similar to that of all hospitalized cases (Supplemental Table 2). The percentage of cases admitted from a facility varied from 10.1% to 30.1%, without a clear trend over time (Table 1). The percentage of cases identified as healthcare workers decreased from 5.7% in March to 1.6% in December. Most cases had at least 2 underlying condition categories, with small variations over time. However, use of COVID-19-associated treatments varied significantly; remdesivir use increased from 1.7% to 53.8% and systemic corticosteroid use increased from 18.9% to74.2% from March

to December (Table 1). While ≥ 40% of patients received hydroxychloroquine treatment in March and April, ≤1% received it after May 2020 (Supplemental Table 3).

Length of Hospital Stay, Interventions and Outcomes among a Sample of Adults

The median LOS for all patients (including those discharged alive and those who died in-hospital) significantly decreased from 6.4 days (IQR 2.9-16.8) in March to 4.7 days (IQR 2.2-9.2) in July, then remained relatively unchanged from July through December (Figure 1A)). Trends in median LOS varied by age group. The median LOS was 4.6 days (IQR 2.3-8.8) for patients who were discharged alive and 10.4 days (IQR 5.0-18.4) for those who died in-hospital (data not shown).

The percentage of hospitalized adults with ICU admission significantly decreased from 37.8% (March) to 20.5% (December) (Figure 1B). ICU admissions significantly decreased for all age groups. Vasopressor use decreased from 22.7% (March) to 12.8% (December) (Figure 1C) with similar trends across the different age groups. Overall, RRT use did not significantly change over time and ranged from 4.1% to 6.7% (Supplemental Table 4).

Overall, 11.4% (95%CI 10.5-12.2) of patients died in-hospital; case fatality was 2.2% (95%CI 1.7-2.8) among adults 18-49 years, 8.0% (95%CI 6.9-9.3) among adults 50-64 years and 18.8% (95%CI 17.1-20.5) among adults ≥65 years of age (data not shown). In-hospital deaths for all ages combined decreased over time, ranging from 13.9% (March) to 11.9% (December) (Figure 1D). Among adults aged ≥65 years, in-hospital deaths decreased from a high of 26.9% (April) to a low of 14% (October) but increased to 17.2% in December. Among adults aged 50-64 years, in-hospital deaths initially decreased from a peak of 10.7% (April) to a low of 3.7% (September) but increased to 9.2% (December). Among all patients who were discharged alive, 3.1% (95%CI 2.5-3.8%) were discharged to hospice (range: 1.2 % in March to 4.1% in December) (data not shown). Among adults aged ≥65 years, 6.7% (95%CI 5.4-8.3%) were discharged to hospice.

Highest Level of Respiratory Support Received among a Sample of Adults

The percentage of patients receiving invasive mechanical ventilation as the highest level of respiratory support significantly decreased from 27.8% (March) to 12.3% (December) (Figure 2A); trends were similar across all 3 age groups (Figure 2B). The percentage of patients receiving HFNC significantly increased from 5.6% (March) to 8.7% (December) but varied over time; the percentage of patients receiving BIPAP or CPAP significantly increased from 2.5% (March) to 7.5% (December). While monthly changes in HFNC were not significant when stratified by the 3 age groups (Figure 2C), there were significant increases in BIPAP or CPAP use over time across all 3 age groups (Figure 2D).

Trends in Interventions and Outcomes by Race/Ethnicity and Age Group for three time periods: March-May, June-September, October-December

Among patients 18-49 years and ≥65 years of age, percentage of ICU admissions significantly decreased over time for White and Black patients, but not for Hispanic patients (Figure 3A and

3C, Supplemental Table 5). For patients 50-64 years of age, percentage of ICU admissions significantly decreased over time for all 3 racial/ethnic groups (Figure 3B, Supplemental Table 5). Among White patients, there was a significant decrease in percentage of in-hospital deaths over time for all 3 age groups (Figure 3D-F, Supplemental Table 5); however, there was no significant decrease in percentage of in-hospital deaths among Black or Hispanic patients across any age group.

Monthly Rates of Hospitalizations, ICU admissions and In-Hospital Deaths

There were 3 distinct peaks in monthly rates of COVID-19-associated hospitalizations, ICU admissions and in-hospital deaths (Figure 4, Supplemental Table 1) in April, July and December 2020. The highest rates for all 3 outcomes occurred during December 2020 (hospitalizations 105.3 per 100,000 population; ICU admissions 20.2; and in-hospital deaths 11.7). While rates for all 3 outcomes increased with age, trends over time were similar across all 3 age groups (Supplemental Figure 1, Supplemental Table 1).

Discussion

Using a large, geographically diverse, population-based surveillance network for COVID-19-associated hospitalizations, we found that monthly rates of hospitalizations, ICU admissions and in-hospital deaths were highest in December, corresponding with the third peak of the U.S. pandemic. Among hospitalized cases, the percentage of ICU admissions, invasive mechanical ventilation, vasopressor support and in-hospital deaths declined during the first 7 months of the pandemic but remained stable or increased in November and December. While percentage of ICU admissions decreased among White and Black patients in all age groups over time, there were no statistically significant decreases in ICU admission percentages among Hispanic persons aged 18-49 or ≥65 years. In addition, we observed statistically significant decreases in the percentage of in-hospital deaths for White patients over time, but not for Black or Hispanic patients. Reasons for the observed trends in rates and percentages of interventions and outcomes are likely multifactorial and might be driven by patterns of community-level transmission, socioeconomic factors, and patient-, provider- and healthcare system- level factors.

Changes in community-level COVID-19 incidence was likely the largest contributor to observed trends in COVID-NET rates of hospitalizations, ICU admissions and in-hospital deaths (15); monthly changes in overall COVID-19 incidence corresponded with monthly changes in COVID-NET hospitalization rates (CDC COVID Data Tracker). Age likely also played a role; the median age of hospitalized adults steadily increased from a low of 56 years in June to 65 years in December. Similar age-related patterns were observed among COVID-19 cases nationally, where the median age declined from 46 years in May to 37 years in July and COVID-19 incidence was highest among persons aged 20-29 years during June-August 2020 (18). Multi-pronged mitigation measures, including mask use, social distancing and case investigations,

may have contributed to decreased hospitalization rates during periods between peaks including June and September-October (19, 26). However, colder weather resulting in increased time spent indoors and holiday gatherings likely contributed to increased community transmission and a surge in hospitalizations in November and December (27, 28). With the availability of multiple COVID-19 vaccines in the U.S. starting in December 2020, and recommendations from the Advisory Committee on Immunization Practices to prioritize vaccination of certain high risk groups (29) and older adults (30), it is anticipated that COVID-19-associated hospitalization rates will decrease over time. This analysis provides an examination of trends in hospitalizations, interventions and outcomes prior to the large-scale availability of COVID-19 vaccines in the United States.

Despite the increase in rates of hospitalizations, ICU admissions and in-hospital deaths during the winter peak of the pandemic, we observed substantial decreases in the percentage of hospitalized cases who received aggressive interventions or died in-hospital during the first 7 months of COVID-NET surveillance, similar to other studies (11, 12, 15, 16). Evolving healthcare provider practices, guided by increasing knowledge and experience in managing patients with COVID-19, likely contributed to improved outcomes (11, 12, 16). While the percentage of patients receiving invasive mechanical ventilation decreased over time across all age groups, use of non-invasive respiratory support modalities, such as BIPAP, CPAP and HFNC increased over the same time-period. Several studies have shown improved outcomes with prone positioning (31) and use of non-invasive ventilatory support in lieu of invasive mechanical ventilation (11, 16, 32) for patients with COVID-19-associated acute respiratory failure. Decreasing use of invasive mechanical ventilation may have also lessened the need for ICU level care, as other respiratory support modalities could be delivered in non-ICU settings. Increasing use of more effective COVID-19-associated treatments may also have positively impacted outcomes. Dexamethasone has been shown to reduce 28-day mortality among patients requiring supplemental oxygen or invasive mechanical ventilation (22); use of systemic corticosteroids in our study increased from less than 20% in March to almost 75% in December 2020. Remdesivir, which has been shown to reduce time to clinical recovery in patients with severe COVID-19 (21), was received by less than 2% of patients in March but increased to over 50% by December 2020. Meanwhile the use of medications found to be ineffective for treatment of COVID-19 (33), such as hydroxychloroquine decreased substantially by June 2020.

Our analysis contributes to an expanding body of literature on racial and ethnic disparities related to COVID-19 (5, 8, 34-39). While the percentage of patients with ICU admissions and in-hospital deaths decreased over time for White patients across all age groups, similar trends were not consistently observed for Black and Hispanic patients. The reasons for these findings need to be explored further. Possible contributing factors, which we did not account for in this analysis, include differences in underlying comorbidities among different racial/ethnic groups, geographic differences in care practices which may correlate with the geographic distribution of different racial/ethnic groups, and long-standing inequities in social determinants of health with downstream effects on overall health of racial/ethnic minority groups (40). Other studies

have similarly found increased COVID-19-associated morbidity and mortality among Black (39) and Hispanic (41, 42) persons. Ensuring equitable access to COVID-19 vaccine among groups at highest risk for COVID-19-associated complications, many of whom comprise racial and ethnic minority groups, will be essential to reducing COVID-19-associated morbidity and mortality in the United States.

Observed trends in interventions and outcomes may in part reflect a complex interplay between COVID-19 incidence and healthcare system capacity. As hospitalization rates peaked in different phases and geographic locations, ICU admission rates likely also increased. However, during peaks, the percentage of hospitalized patients receiving ICU admission or mechanical ventilation could have decreased or been capped due to scarcity of resources. Similarly, changes in timing of discharge and discharge disposition may in part have been influenced by bed capacity or the ability to discharge patients to sub-acute or chronic care facilities. In our study, almost 7% of patients 65 years and older were discharged to hospice. Among all patients, the percentage discharged to hospice increased from 1% in March to 4% in December 2020. Patterns in mortality may also be influenced by healthcare system capacity. One study conducted among 88 Department of Veterans Affairs hospitals found that strains on ICU capacity were associated with higher rates of COVID-19-associated ICU mortality (43). Linkage of COVID-NET data to facility-level data could allow for more direct examination of the impact of resource availability on COVID-19-associated interventions and outcomes. In addition, surveillance for post-discharge outcomes can provide a more complete picture of the out-of-hospital mortality burden among patients hospitalized with COVID-19.

This analysis has several limitations. Because COVID-NET covers approximately 10% of the U.S. population, our findings may not be generalizable to the entire country. This analysis presented data for the entire network and did not account for differences across sites; several factors, including peaks in hospitalization rates and the racial/ethnic distribution of cases varied by site. Since SARS-CoV-2 testing was conducted at the discretion of healthcare providers, COVID-NET may not have captured all COVID-19-associated hospitalizations. Changes in testing practices over the course of the pandemic may have influenced trends as sicker patients were more likely to be tested early in the pandemic when testing capacity was limited. The relative standard errors for some estimates were >0.3, particularly for interventions or outcomes with low prevalence, such as RRT or in-hospital deaths among patients aged 18-49 years. Lastly, sample sizes were not sufficient to fully explore differences in interventions and outcomes by race/ethnicity or to produce estimates for all racial/ethnic groups including AI/AN and Asian/PI patients. In future analyses, COVID-NET will combine additional months of data to characterize trends in severe outcomes among these racial/ethnic groups.

This analysis describes changes in characteristics, interventions and outcomes among U.S. adults hospitalized with COVID-19 over the first 10 months of the pandemic. Large declines in the percentage of patients with COVID-19-associated interventions and outcomes during the first seven months of the pandemic were encouraging, and likely reflected successful

implementation of mitigation strategies as well as increasing healthcare provider knowledge, experience and tools to combat COVID-19. However, concerning increases in rates of hospitalization, ICU admission and in-hospital death emerged during the third pandemic peak. This study highlights ongoing racial and ethnic disparities in COVID-19-associated outcomes, as improvements in markers of disease severity over time were differentially observed across racial/ethnic groups. It will be important to follow trends in patient characteristics and outcomes over time in order to monitor impacts of clinical and public health interventions, including vaccination, and to ensure that progress is being made in closing the gap in racial and ethnic disparities related to COVID-19-associated outcomes in the United States.

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Table 1. Demographic and Clinical Characteristics of Adults with Laboratory-Confirmed COVID-19-Associated Hospitalizations by Month, COVID-NET, March-December 2020

Variable	Overall Unweighted N	Overall	March	April	May	June	July	August	September	October	November	December
Demographic Characteristics of all Cases[1]	116,743	Unweighted Percent (95% CI)										
Age Group												
18-49 years	30,779	26.4 (26.1-26.6)	24.5 (23.3-25.7)	23.1 (22.4-23.9)	29.8 (28.9-30.7)	36.9 (35.7-38.1)	34.9 (34.0-35.9)	33.9 (32.9-35.0)	30.7 (29.5-32.0)	26.6 (25.7-27.5)	22.5 (22.0-23.1)	21.3 (20.8-21.8)
50-64 years	32,312	27.7 (27.4-27.9)	32.9 (31.6-34.2)	29.0 (28.2-29.8)	28.4 (27.5-29.3)	28.3 (27.2-29.5)	28.7 (27.9-29.6)	28.1 (27.1-29.1)	27.8 (26.6-29.0)	28.0 (27.1-28.9)	26.6 (26.0-27.2)	25.8 (25.3-26.4)
≥65 years	53,652	46.0 (45.7-46.2)	42.6 (41.3-44.0)	47.9 (47.0-48.8)	41.9 (40.9-42.8)	34.8 (33.6-36.0)	36.3 (35.4-37.2)	38.0 (36.9-39.1)	41.5 (40.1-42.8)	45.4 (44.4-46.4)	50.9 (50.2-51.5)	52.9 (52.3-53.5)
Median Age (IQR)		62.0 (48.1-74.6)	60.9 (49.3-72.3)	63.0 (50.3-75.4)	60.0 (45.7-73.4)	55.6 (40.7-69.9)	57.1 (42.1-70.0)	58.1 (42.6-71.4)	59.6 (44.4-73.1)	61.9 (47.8-74.2)	64.4 (50.8-76.1)	65.4 (51.7-77.0)
Male Sex	59,131	50.7 (50.4-50.9)	55.1 (53.7-56.5)	53.2 (52.3-54.0)	50.1 (49.1-51.0)	49.0 (47.7-50.3)	49.5 (48.6-50.5)	48.8 (47.7-50.0)	48.5 (47.1-49.8)	51.1 (50.1-52.1)	51.2 (50.5-51.8)	50.0 (49.4-50.6)
Race/Ethnicity[3]												
NH White	46,923	40.8 (40.5-41.0)	36.6 (35.3-37.9)	35.6 (34.8-36.4)	32.1 (31.2-33.1)	26.8 (25.7-28.0)	29.0 (28.2-29.9)	33.3 (32.2-34.4)	40.8 (39.5-42.1)	46.4 (45.4-47.4)	49.5 (48.8-50.1)	48.4 (47.8-49.0)
NH Black	31,019	26.9 (26.7-27.2)	40.0 (38.7-41.4)	34.3 (33.5-35.1)	29.1 (28.3-30.0)	30.4 (29.2-31.6)	36.9 (36.0-37.9)	31.5 (30.5-32.6)	24.7 (23.6-25.9)	20.8 (20.0-21.7)	18.8 (18.3-19.4)	23.0 (22.5-23.6)
NH AI/AN	1,619	1.4 (1.3-1.5)	0.5 (0.3-0.7)	1.3 (1.1-1.5)	2.4 (2.2-2.8)	1.8 (1.5-2.2)	1.0 (0.8-1.2)	0.6 (0.4-0.8)	1.0 (0.8-1.3)	1.2 (1.0-1.4)	1.6 (1.4-1.8)	1.5 (1.4-1.7)
NH Asian/PI	5,793	5.0 (4.9-5.2)	5.1 (4.5-5.7)	4.5 (4.2-4.9)	4.9 (4.5-5.3)	5.8 (5.3-6.5)	4.6 (4.2-5.0)	6.7 (6.1-7.3)	6.6 (5.9-7.3)	4.6 (4.2-5.1)	4.5 (4.3-4.8)	5.1 (4.8-5.4)
Hispanic or Latino	23,079	20.0 (19.8-20.3)	13.7 (12.8-14.7)	20.6 (19.9-21.3)	27.4 (26.5-28.3)	29.9 (28.7-31.1)	23.6 (22.8-24.4)	22.3 (21.3-23.2)	21.6 (20.5-22.7)	21.6 (20.8-22.4)	17.8 (17.3-18.3)	14.8 (14.4-15.2)
Characteristics of Sampled Cases[2]	18,508	Weighted Percent (95% CI)										
Facility Residence[4]	3,110	16.4 (15.4-17.4)	11.3 (9.0-14.0)	30.1 (27.9-32.3)	26.4 (24.1-28.8)	14.4 (11.4-17.8)	10.1 (8.1-12.3)	15.9 (13.1-19.1)	11.7 (8.8-15.1)	11.0 (8.5-14.0)	14.2 (12.0-16.6)	14.3 (11.1-17.9)
Healthcare Worker[5]	809	3.2 (2.9-3.7)	5.7 (4.0-7.8)	5.6 (4.6-6.8)	5.0 (3.9-6.3)	4.3 (2.8-6.5)	3.0 (1.9-4.4)	4.2 (2.7-6.2)	3.0 (1.7-4.8)	2.5 (1.4-4.0)	2.2 (1.5-3.1)	1.6 (0.8-3.0)*
Current Tobacco Use	1,466	7.3 (6.7-8.0)	4.5 (3.1-6.3)	7.0 (5.8-8.3)	7.8 (6.4-9.4)	9.9 (7.3-12.9)	6.7 (5.1-8.6)	10.3 (7.9-13.2)	10.2 (7.3-13.7)	7.4 (5.4-9.9)	7.1 (5.7-8.6)	6.2 (4.5-8.3)

Underlying Conditions[6]													
0	3,577	16.0 (15.1-16.9)	14.4 (11.7-17.5)	12.8 (11.3-14.5)	17.5 (15.6-19.7)	27.5 (23.5-31.7)	17.5 (15.0-20.1)	19.9 (17.0-23.1)	25.3 (21.4-29.5)	14.2 (11.4-17.3)	12.9 (11.2-14.8)	14.4 (11.7-17.4)
1	4,692	22.5 (21.5-23.6)	23.4 (20.2-26.9)	22.1 (20.2-24.2)	24.6 (22.3-27.1)	22.6 (19.1-26.5)	28.2 (25.1-31.5)	22.0 (18.7-25.6)	24.1 (20.2-28.5)	23.9 (20.3-27.8)	20.6 (18.4-22.9)	20.4 (17.2-23.8)
2	4,389	24.9 (23.7-26.0)	27.3 (23.8-31.1)	25.5 (23.4-27.7)	23.9 (21.6-26.4)	22.6 (18.9-26.6)	23.4 (20.5-26.5)	23.1 (19.8-26.7)	19.4 (15.9-23.3)	24.7 (21.0-28.7)	27.3 (24.7-30.0)	25.2 (21.7-28.9)
≥3	5,850	36.6 (35.4-37.9)	34.8 (31.0-38.8)	39.6 (37.2-41.9)	33.9 (31.3-36.5)	27.3 (23.3-31.5)	30.9 (27.7-34.3)	35.0 (31.1-39.0)	31.2 (26.8-35.9)	37.2 (33.1-41.4)	39.2 (36.3-42.1)	40.1 (36.0-44.3)
Symptom[7] **Onset to Admit Median (IQR)**	12,372	4.7 (2.1-7.0)	5.5 (2.5-7.7)	4.8 (1.9-6.9)	4.5 (1.9-6.9)	4.4 (2.1-6.8)	4.5 (2.1-6.8)	4.1 (2.0-7.0)	4.9 (2.1-8.0)	4.8 (2.3-6.9)	5.0 (2.2-7.1)	4.6 (2.0-7.3)
COVID-19 Associated Treatment													
Remdesivir	4,923	36.1 (34.8-37.5)	1.7 (0.8-2.7)	2.8 (2.0-3.5)	15.5 (13.7-17.3)	29.9 (25.7-34.0)	31.6 (28.4-34.9)	32.1 (28.3-35.8)	38.7 (34.1-43.4)	45.5 (41.2-49.7)	54.3 (51.4-57.2)	53.8 (49.7-57.9)
Systemic Corticosteroids	6,856	54.8 (53.5-56.1)	18.9 (15.7-22.0)	20.9 (18.9-22.9)	19.6 (17.3-21.8)	31.2 (27.0-35.4)	61.1 (57.7-64.5)	59.2 (55.3-63.1)	58.6 (54.0-63.2)	65.0 (60.9-69.1)	74.0 (71.5-76.5)	74.2 (70.7-77.7)
Convalescent Plasma	1,938	10.5 (9.7-11.3)	0.5 (0.0-1.0)	3.8 (2.9-4.7)	10.4 (8.8-12.0)	12.4 (9.6-15.3)	14.0 (11.6-16.3)	11.6 (9.1-14.2)	11.3 (8.4-14.2)	17.4 (14.1-20.7)	12.2 (10.3-14.1)	9.7 (7.4-12.0)

1 Demographic characteristics are described for the entire COVID-NET population; estimates are unweighted.

2 Patient and clinical characteristics are described for the sampled population; estimates are weighted.

3 Race/ethnicity: NH= Non-Hispanic; Overall- People of more than one race/ethnicity n=377 (0.3%); Unknown n = 6313 (5.5%)

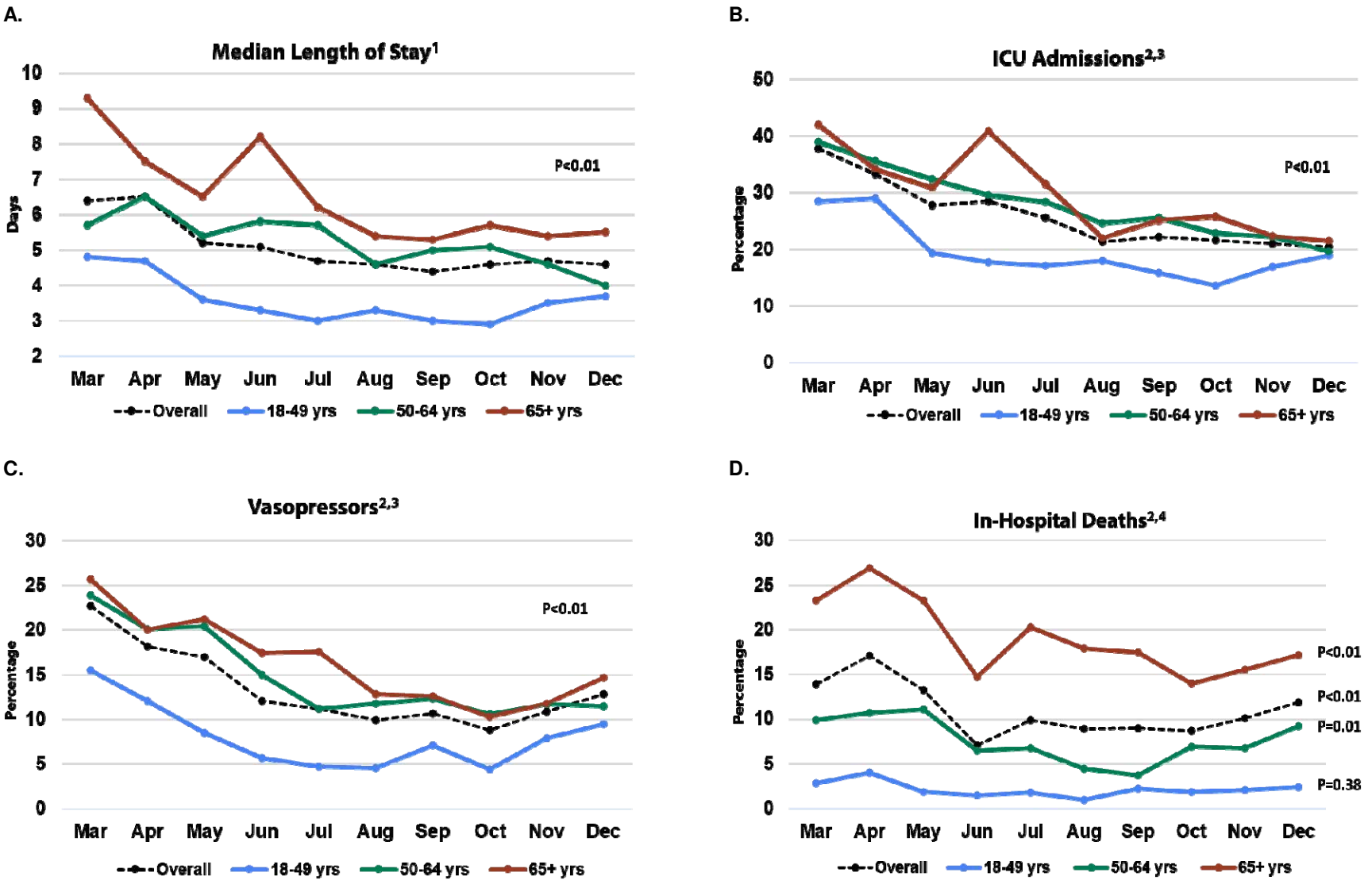
4 Facility residence at the time of admission is defined as residence in any of the following: rehabilitation facilities, assisted living/residential care, group homes, nursing homes, skilled nursing facilities, long-term care facilities, long term acute care hospitals, alcohol/drug treatment centers and psychiatric facilities.

5 Healthcare worker refers to all paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or infectious materials.

6 Number of underlying condition categories

7 Number of days from symptom onset to admission

Figure 1. Trends in Length of Stay and Percentages of Interventions and Outcomes among Hospitalized Adults with COVID-19 by Age Group and Month, COVID-NET, March-December 2020



1. Median lengths of stay for all patients (including those who died in-hospital and were discharged alive) were compared across months using the Mann-Whitney-U test; p-value <0.01 for all ages combined and each individual age group

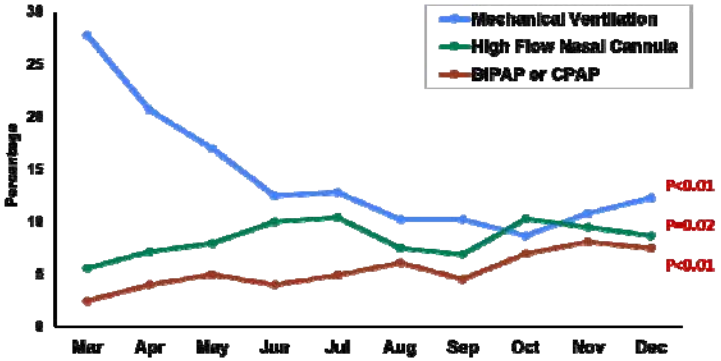
2. Logistic regression models used to test statistical significance of monthly trends for ICU, vasopressors and death by assigning month as a single continuous predictor in models for all ages combined and individual age group.

3. P-value <0.01 for all ages combined and each individual age group

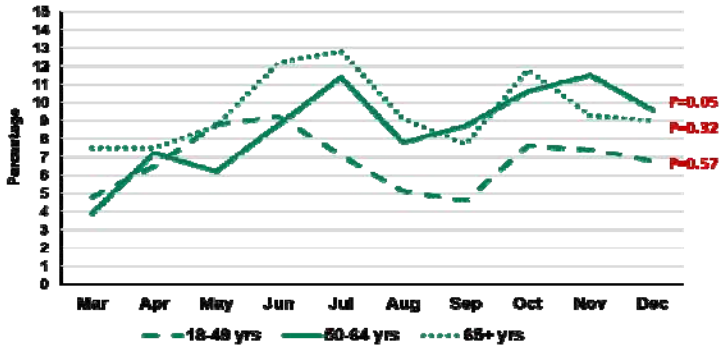
4. P-value ≤0.01 for all ages combined and for adults 50-64 years and ≥65 years of age

Figure 2. Trends[1] in Highest Level of Respiratory Support Received among Hospitalized Adults with COVID-19 by Month, COVID-NET, March-December 2020

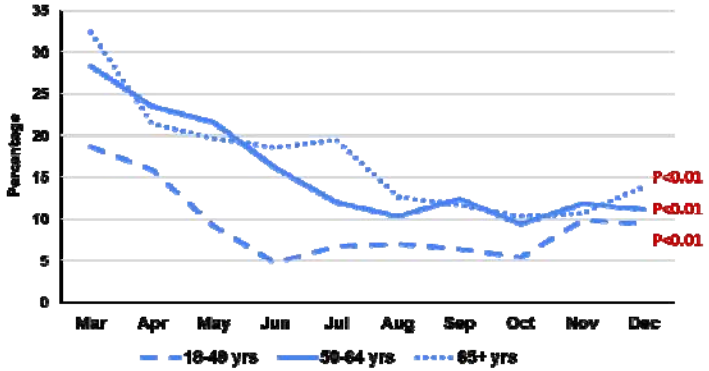
A. Respiratory Support Among All Age Groups



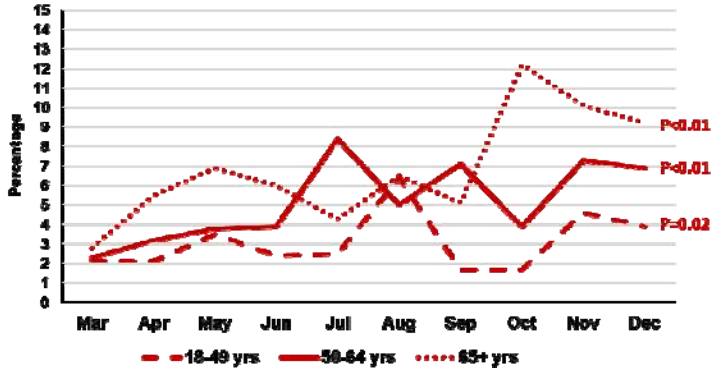
C. High Flow Nasal Cannula by Age Group



B. Mechanical Ventialtion by Age Group

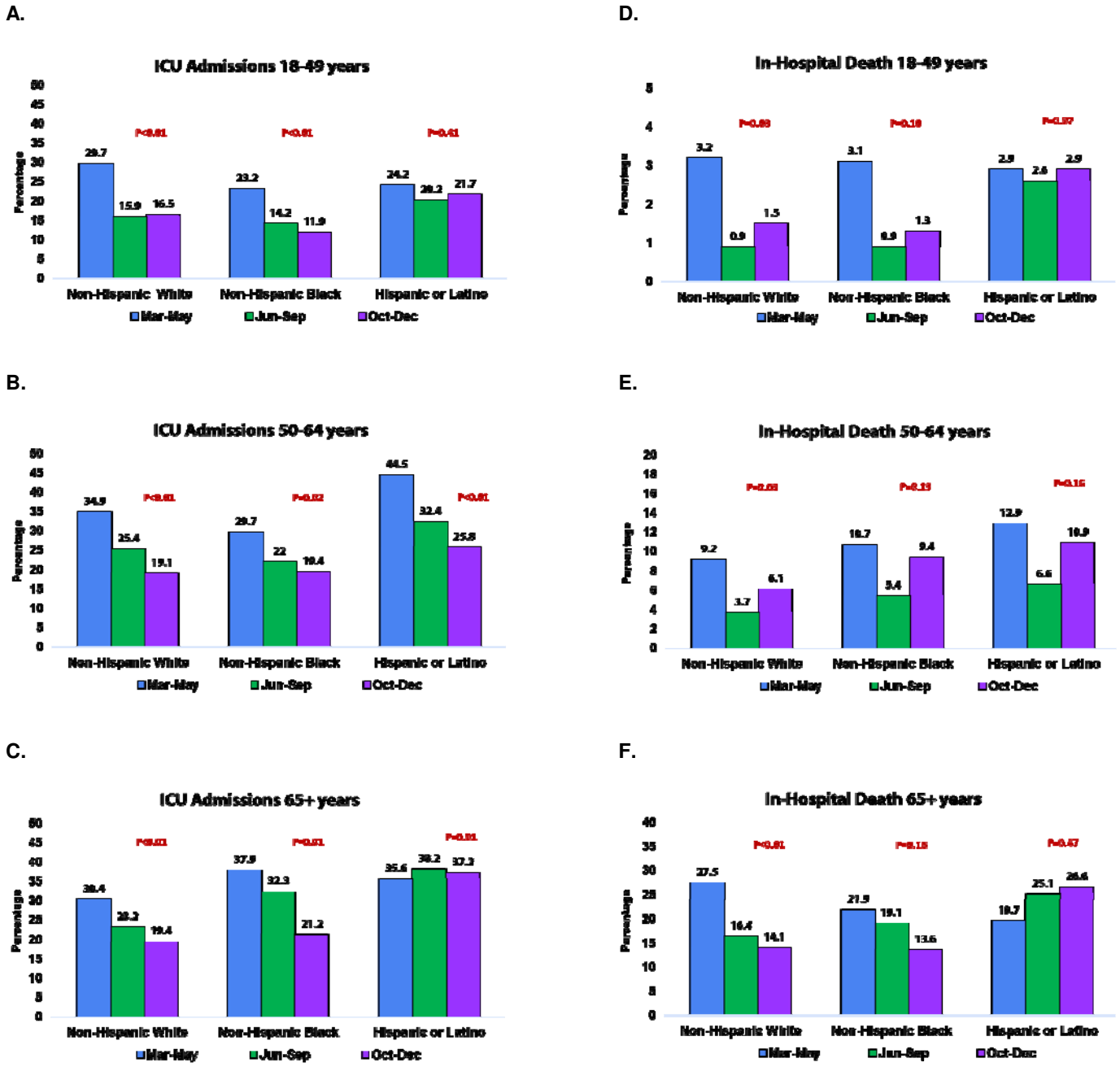


D. BIPAP/CPAP by Age Group



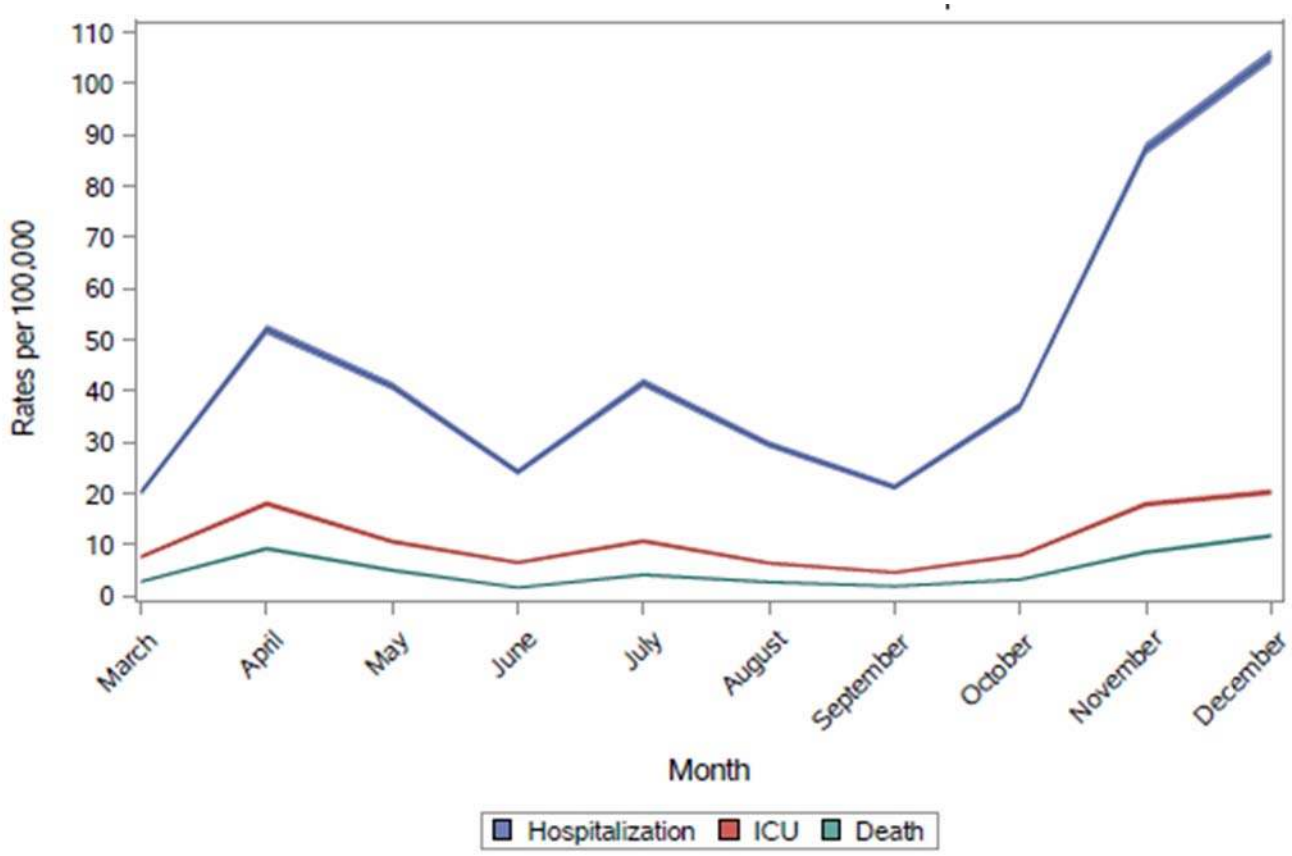
1 Logistic regression models were used to test the statistical significance of monthly trends in interventions by assigning MMWR month as a single continuous predictor in models for all ages combined and for each individual age group strata

Figure 3. Trends[1] in Percentage of Hospitalized Adults with COVID-19 with Severe Outcomes by Age and Race/ Ethnicity, COVID-NET, March-December 2020



1 Logistic regression models were used to test the statistical significance of trends in outcomes over time by assigning monthly groupings (March-May, June-September, October-December) as a single continuous predictor in models for each age by race strata.

Figure 4. Rates (with 95% Confidence Intervals) of COVID-19- Associated Hospitalization[1], Intensive Care Unit Admission[2] and in-Hospital Death[2] by Month, COVID-NET, March-December 2020.



1. Unadjusted hospitalization rates per 100,000 population were calculated by taking the total number of cases each month, divided by the National Center for Health Statistics' vintage 2019 bridge-race postcensal population estimates for the counties included in surveillance.
2. Unadjusted ICU admission and death rates among hospitalized patients were calculated using the weighted number of sampled cases per month with each outcome as the numerator, divided by the National Center for Health Statistics' vintage 2019 bridge-race postcensal population estimates for the counties included in surveillance.

Supplemental Table 1. Rates (and 95% Confidence Internals) of Hospitalization[1], Intensive Care Unit Admission[2] and In-Hospital Death[2] per 100,000 Persons by Age Group and Month, COVID-NET, March-December 2020

Month	Overall			18-49 Years			50-64 Years			≥65 Years		
	Hospitalization Rate (95% CI)	ICU Rate (95% CI)	In-Hospital Death Rate (95% CI)	Hospitalization Rate (95% CI)	ICU Rate (95% CI)	In-Hospital Death Rate (95% CI)	Hospitalization Rate (95% CI)	ICU Rate (95% CI)	In-Hospital Death Rate (95% CI)	Hospitalization Rate (95% CI)	ICU Rate (95% CI)	In-Hospital Death Rate (95% CI)
March	20.2 (19.6-20.8)	7.6 (7.3-8.0)	2.8 (2.6-3.0)	8.7 (8.2-9.2)	2.4 (2.1-2.6)	0.2 (0.2-0.3)	27.3 (26.0-28.6)	11.1 (10.3-11.9)	2.8 (2.4-3.2)	45.4 (43.5-47.3)	18.9 (17.7-20.1)	10.6 (9.7-11.5)
April	52.0 (51.1-52.9)	18.0 (17.5-18.5)	9.2 (8.9-9.6)	21.2 (20.4-22.0)	6.4 (6.0-6.8)	0.9 (0.7-1.0)	61.9 (59.9-63.9)	22.4 (21.2-23.6)	6.7 (6.1-7.4)	131.4 (128.1-134.6)	47.2 (45.3-49.2)	37.4 (35.7-39.1)
May	40.9 (40.2-41.7)	10.6 (10.2-11.0)	5.0 (4.7-5.3)	21.5 (20.7-22.2)	4.0 (3.7-4.3)	0.4 (0.3-0.5)	47.8 (46.0-49.5)	14.6 (13.7-15.6)	5.0 (4.5-5.6)	90.4 (87.7-93.1)	24.9 (23.5-26.3)	18.8 (17.6-20.0)
June	24.2 (23.6-24.8)	6.5 (6.2-6.8)	1.6 (1.5-1.8)	15.7 (15.1-16.4)	2.8 (2.5-3.1)	0.2 (0.2-0.3)	28.1 (26.8-29.4)	8.3 (7.6-9.0)	1.8 (1.5-2.2)	44.3 (42.4-46.2)	15.2 (14.1-16.3)	5.5 (4.8-6.2)
July	41.6 (40.8-42.4)	10.7 (10.3-11.1)	4.1 (3.9-4.4)	25.6 (24.8-26.4)	4.4 (4.1-4.8)	0.5 (0.4-0.6)	49.1 (47.4-50.8)	14.3 (13.4-15.3)	3.4 (3.0-3.9)	79.6 (77.1-82.1)	24.6 (23.2-26.0)	16.0 (14.9-17.2)
August	29.6 (28.9-30.2)	6.4 (6.1-6.7)	2.7 (2.5-2.9)	17.7 (17.0-18.4)	3.0 (2.7-3.3)	0.2 (0.1-0.2)	34.1 (32.7-35.6)	8.1 (7.4-8.8)	1.5 (1.2-1.8)	59.2 (57.0-61.4)	14.4 (13.3-15.4)	11.7 (10.8-12.7)
September	21.2 (20.7-21.8)	4.6 (4.3-4.8)	1.9 (1.7-2.0)	11.5 (11.0-12.1)	1.8 (1.6-2.0)	0.3 (0.2-0.3)	24.3 (23.0-25.5)	5.7 (5.1-6.3)	0.8 (0.6-1.0)	46.4 (44.5-48.4)	11.4 (10.4-12.3)	8.0 (7.2-8.8)
October	37.1 (36.3-37.8)	7.9 (7.6-8.3)	3.2 (3.0-3.4)	17.4 (16.7-18.1)	2.4 (2.1-2.6)	0.3 (0.2-0.4)	42.7 (41.0-44.3)	9.6 (8.9-10.4)	2.9 (2.5-3.3)	88.8 (86.1-91.4)	22.4 (21.1-23.8)	12.2 (11.2-13.2)
November	87.2 (86.1-88.4)	17.9 (17.4-18.4)	8.5 (8.2-8.9)	34.7 (33.7-35.6)	5.7 (5.3-6.1)	0.7 (0.6-0.9)	95.3 (92.9-97.7)	20.9 (19.7-22.0)	6.3 (5.7-7.0)	234.0 (229.7-238.4)	50.5 (48.4-52.5)	34.8 (33.1-36.5)
December	105.3 (104.1-106.6)	20.2 (19.7-20.8)	11.7 (11.3-12.1)	39.5 (38.5-40.5)	7.0 (6.6-7.5)	0.9 (0.7-1.0)	111.9 (109.2-114.5)	20.8 (19.6-21.9)	9.7 (9.0-10.5)	293.8 (289.0-298.7)	58.9 (56.8-61.1)	46.6 (44.7-48.6)

1. Unadjusted hospitalization rates per 100,000 population were calculated by taking the total number of cases each month, divided by the National Center for Health Statistics' vintage 2019 bridge-race postcensal population estimates for the counties included in surveillance.
2. Unadjusted ICU admission and death rates among hospitalized patients were calculated using the weighted number of sampled cases per month with each outcome as the numerator, divided by the National Center for Health Statistics' vintage 2019 bridge-race postcensal population estimates for the counties included in surveillance.

Supplemental Table 2: Demographic Characteristics of Sampled versus All Cases Hospitalized with COVID-19, COVID-NET, March-December 2020

Variable	Sampled Cases; Unweighted N (Wtd %)	Total Cases; Unweighted N (UnWtd %)	Mar Sampled Wtd %	Mar Total UnWtd %	Apr Sampled Wtd %	Apr Total UnWtd %	May Sampled Wtd %	May Total UnWtd %	Jun Sampled Wtd %	June Total UnWtd %	Jul Sampled Wtd %	Jul Total UnWtd %
Median Age	18,508 (62.1)	116,743 (62)	61	61	63	63	60	60	55	56	58	57
Sex												
Male	9,410 (51.1)	59,131 (50.7)	59	55	53	53	49	50	51	49	47	50
Female	90,98 (48.9)	57,608 (49.3)	42	45	47	47	51	50	49	51	53	51
Race/Ethnicity												
NH White	7,469 (41.7)	46,923 (40.8)	35	37	39	36	31	32	26	27	29	29
NH Black	4,374 (27.2)	31,019 (26.9)	43	40	32	34	30	29	30	30	38	37
NH AI/AN	398 (1.6)	1619 (1.4)	0	1	1	1	2	2	2	2	1	1
NH Asian	1,449 (5.3)	5793 (5)	5	5	4	5	5	5	7	6	5	5
NH Multiracial	67 (0.4)	377 (0.3)	0	0	0	0	0	0	1	0	1	1
Hispanic or Latino	4,192 (20.5)	23,079 (20)	13	14	21	21	29	27	32	30	24	24
Unknown	556 (3.2)	6313 (5.5)	3	4	2	3	2	4	3	5	3	4
Surveillance Site												
CA	937 (7.6)	8923 (7.6)	6	6	4	4	3	4	12	9	11	11
CO	1,024 (9.7)	11,206 (9.6)	17	17	14	13	6	8	6	5	4	5
CT	1,021 (4.9)	5708 (4.9)	7	8	12	12	7	7	2	2	1	1
GA	955 (15.2)	17,478 (15)	24	24	9	10	9	9	18	22	35	33
IA	159 (0.5)	701 (0.6)	0	0	1	1	1	1	0	0	1	0
MD	1,436 (22.1)	25,909 (22.2)	18	18	34	34	38	38	24	25	15	16
MI	552 (3.4)	3880 (3.3)	7	7	5	5	1	1	0	1	1	1
MN	5,849 (10.6)	12,476 (10.7)	3	3	6	6	15	14	11	10	7	7

NM	641 (4.3)	5107 (4.4)	1	1	2	2	3	3	3	3	4	4
NYA	303 (2.2)	2522 (2.2)	3	3	3	2	2	2	1	1	1	1
NYR	446 (3.5)	4052 (3.5)	3	3	2	2	4	4	2	2	1	1
OH	748 (3.5)	4043 (3.5)	3	3	3	3	4	4	5	5	5	5
OR	719 (2.4)	2861 (2.5)	3	3	2	2	1	1	2	2	2	2
TN	1869 (7)	8045 (6.9)	6	6	3	3	4	4	10	8	9	9
UT	1,849 (3.3)	3832 (3.3)	1	1	1	1	2	2	5	5	4	4

*Wtd = weighted percentage; Unwtd= unweighted percentage

Supplemental Table 2 Continued…

Variable	Aug Sampled Wtd %	Aug Total UnWtd %	Sept Sampled Wtd %	Sept Total UnWtd %	Oct Sampled Wtd %	Oct Total UnWtd %	Nov Sampled Wtd %	Nov Total UnWtd %	Dec Sampled Wtd %	Dec Total UnWtd %
Median Age	60	58	60	60	62	62	64	64	65	65
Sex										
Male	49	49	49	49	53	51	50	51	53	50
Female	51	51	51	52	47	49	50	49	48	50
Race/Ethnicity										
NH White	35	33	41	41	45	46	51	50	51	48
NH Black	33	32	26	25	22	21	19	19	23	23
NH AI/AN	1	1	1	1	1	1	3	2	2	2
NH Asian	7	7	8	7	7	5	6	5	4	5
NH Multiracial	0	0	0	1	1	0	0	0	1	0
Hispanic or Latino	21	22	21	22	21	22	17	18	17	15
Unknown	3	5	4	5	4	5	4	8	3	7
Surveillance Site										
CA	13	14	8	12	5	5	4	5	11	11
CO	5	4	5	6	13	13	15	14	8	7
CT	2	1	2	2	3	3	5	5	5	5
GA	25	25	18	17	12	12	8	8	13	13
IA	1	1	1	1	1	1	1	1	0	0
MD	19	19	23	21	17	17	18	18	18	19
MI	1	1	2	2	4	4	5	5	4	4
MN	12	12	13	13	14	14	14	15	9	9
NM	2	3	3	3	7	7	7	7	5	5
NYA	1	1	1	1	2	2	2	2	4	4

NYR	1	1	2	2	2	2	4	4	7	7
OH	4	4	5	5	4	4	3	3	2	2
OR	3	3	3	4	3	3	3	3	3	2
TN	8	8	8	8	9	9	7	7	8	8
UT	3	3	6	6	6	6	4	4	3	3

*Wtd = weighted percentage; Unwtd= unweighted percentage

Supplemental Table 3. Percentage Receiving COVID-19 Associated Treatments Among Hospitalized Adults with COVID-19 by Month, COVID-NET, March-December 2020

Month	Unweighted N	Cortico-steroids	Remdesivir	Azithromycin	Convalescent Plasma	HCQ[1]	Tocilizumab	Zinc	Vitamin C	Protease Inhibitor[2]	Other Drug[3]	Study Drug[4]	Remdesivir Study
		Weighted %											
Overall	18,508	54.80	36.13	25.96	10.48	8.19	2.54	6.86	6.61	0.30	1.64	0.72	0.29
March	1,375	18.88	1.75	43.52	0.46	48.93	4.90	3.61	2.55	4.28	0.94	0.06	1.44
April	3,488	20.87	2.78	32.84	3.83	40.85	7.83	7.99	7.11	0.60	0.97	0.37	0.40
May	3,466	19.59	15.53	22.67	10.40	8.58	6.56	8.94	8.91	0.09	0.94	1.28	0.30
June	1,523	31.17	29.88	22.02	12.42	0.56	3.67	6.20	6.46	0.02	0.52	2.50	0.36
July	2,176	61.12	31.61	29.95	13.97	0.78	2.48	6.12	5.94	0.07	1.01	1.41	0.02
August	1,823	59.19	32.06	26.02	11.64	1.09	0.87	5.81	5.88	0.34	0.85	1.01	0.34
September	1,472	58.57	38.74	22.58	11.28	0.24	1.07	5.91	5.28	0.00	1.18	1.03	0.80
October	901	65.00	45.47	24.14	17.42	0.38	1.38	7.75	6.56	0.00	1.08	0.55	0.13
November	1,429	73.98	54.33	24.07	12.18	0.39	0.60	5.23	5.31	0.00	1.17	0.58	0.26
December	855	74.19	53.82	22.19	9.71	0.36	0.36	8.15	8.22	0.00	3.85	0.19	0.05

HCQ= Hydroxychloroquine

1. Hydroxychloroquine with or without azithromycin
2. Protease inhibitors excluded if patient had known history of HIV
3. Other drugs include: chloroquine, sarilumab (Kevzara), Baricitinib (Olumiant), losartan, immunomodulators, casirivimab/imdevimab (REGN-COV2), bamlanivimab, IVIG, interferon, ivermectin, cholecalciferol and daclizumab
4. Study drugs other than remdesivir studies include: hydroxychloroquine study, losartan study, baricitinib study, monoclonal antibody study, interferon study, sarilumab (Kevzara) study, tocilizumab study, casirivimab/Imdevimab (REGN-COV2) study, kinase Inihibitor study, convalescent plasma study, dexamethasone study and other specified study drugs

Supplemental Table 4. Percentage with Clinical Interventions and Outcomes among Adults with Laboratory-Confirmed COVID-19-Associated Hospitalizations by Month, COVID-NET, March-December 2020

Age Group (Years)	Variable	March		April		May		June		July	
		N	Wtd % (95%CI)	N	Wtd % (95%CI)	N	Wtd % (95%CI)	N	Wtd % (95%CI)	N	Wtd % (95%CI)
All Ages (≥18 years)	N	1,375		3,488		3,466		1,523		2,176	
	ICU Admission	500	37.8 (33.9-41.8)	1,153	33.3 (31.0-35.7)	965	27.8 (25.3-30.3)	421	28.5 (24.4-32.8)	531	25.6 (22.6-28.8)
	Mechanical Vent	343	27.8 (24.2-31.5)	677	20.7 (18.8-22.8)	560	17.0 (15.0-19.2)	201	12.5 (9.7-15.7)	238	12.8 (10.5-15.5)
	CPAP/BIPAP	37	2.5 (1.4-4.0)	142	4.0 (3.1-5.1)	175	5.0 (3.8-6.3)	59	4.0 (2.3-6.3)	124	4.9 (3.6-6.5)
	HFNC	82	5.6 (3.9-7.8)	280	7.2 (6.0-8.6)	250	8.0 (6.6-9.7)	105	10.0 (7.2-13.4)	165	10.4 (8.3-12.9)
	RRT	80	6.3 (4.5-8.5)	206	6.7 (5.5-8.0)	178	5.9 (4.6-7.3)	58	4.6 (2.9-6.9)	69	5.1 (3.6-7.0)
	Vasopressor Use	278	22.7 (19.4-26.3)	589	18.2 (16.4-20.2)	534	17.0 (15.0-19.2)	197	12.1 (9.4-15.2)	199	11.2 (9.0-13.7)
	In-Hospital Death	163	13.9 (11.2-17.0)	487	17.1 (15.2-19.0)	394	13.2 (11.3-15.1)	91	7.1 (5.0-9.8)	146	9.9 (7.8-12.3)
	LOS[1] among alive	1,203	6.0 (2.6-17.1)	2,990	6.1 (3.1-12.9)	3,045	4.9 (2.4-9.9)	1,424	4.7 (2.3-9.4)	2,015	4.3 (2.0-7.7)
	LOS[1] among deaths	163	9.0 (5.1-15.8)	487	8.0 (4.3-15.0)	394	8.1 (3.7-17.4)	91	15.6 (10.1-23.5)	145	12.8 (10.2-21.9)
	LOS[1] among all	1,372	6.4 (2.9-16.8)	3,480	6.5 (3.2-13.3)	3,443	5.2 (2.5-10.9)	1,520	5.1 (2.4-10.7)	2,164	4.7 (2.2-9.2)
18-49	N	539		1,303		1,403		669		952	
	ICU Admission	174	28.5 (22.2-35.5)	385	29.0 (24.7-33.5)	310	19.4 (16.0-23.3)	137	17.8 (12.9-23.6)	163	17.2 (12.9-22.2)
	Mechanical Vent	112	18.7 (13.4-24.9)	208	15.9 (12.6-19.7)	155	9.2 (6.8-12.1)	49	4.8 (2.7-7.9)	68	6.8 (4.2-10.4)
	CPAP/BIPAP	15	2.1 (0.6-5.0)*	35	2.1 (1.0-3.7)*	37	3.5 (1.9-5.9)	13	2.4 (0.7-5.9)*	26	2.5 (1.0-5.3)*
	HFNC	30	4.8 (2.3-8.8)*	90	6.5 (4.4-9.2)	108	8.8 (6.2-12.0)	44	9.2 (5.4-14.3)	50	7.1 (4.2-11.1)
	RRT	31	4.8 (2.3-8.6)*	76	6.2 (4.1-8.9)	51	3.4 (1.9-5.5)	16	1.7 (0.7-3.3)*	13	0.8 (0.3-1.8)*
	Vasopressor Use	92	15.5 (10.7-21.5)	163	12.1 (9.2-15.6)	140	8.5 (6.2-11.3)	43	5.7 (3.0-9.7)	49	4.7 (2.6-7.9)
	In-Hospital Death	24	2.8 (1.2-5.5)*	47	4.0 (2.3-6.5)	26	1.9 (0.8-3.7)*	11	1.5 (0.3-4.6)*	12	1.8 (0.5-4.6)*
	LOS[1] among alive	509	4.7 (2.0-9.0)	1,252	4.6 (2.3-9.0)	1,374	3.5 (1.9-6.9)	655	3.2 (1.7-6.2)	935	2.9 (1.5-5.4)
	LOS[1] among deaths	24	15.6* (7.6-30.7)	47	7.4 (5.7-9.2)	26	(4.9-16.6)	11	17.6 (14.2-20.9)	11	(9.7-15.6)
	LOS[1] among all	537	4.8 (2.1-9.3)	1,300	4.7 (2.4-9.0)	1,402	3.6 (1.9-7.1)	668	3.3 (1.7-6.4)	947	3.0 (1.6-5.6)
50-64	N	376		882		879		448		595	
	ICU Admission	145	39.0 (32.1-46.1)	331	35.6 (31.4-40.0)	307	32.4 (27.7-37.4)	144	29.5 (22.4-37.5)	189	28.4 (22.9-34.5)
	Mechanical Vent	104	28.3 (22.3-34.9)	200	23.5 (19.8-27.5)	204	21.6 (17.6-26.1)	79	16.2 (10.7-23.0)	86	12.0 (8.2-16.7)
	CPAP/BIPAP	8	2.3 (0.8-5.2)*	37	3.2 (1.9-4.9)	37	3.8 (2.1-6.2)	23	3.9 (1.5-8.4)*	53	8.4 (5.4-12.5)

	HFNC	15	3.9 (1.6-7.8)*	72	7.2 (5.1-9.9)	51	6.2 (3.9-9.3)	30	8.8 (4.5-15.2)	53	11.4 (7.5-16.4)
	RRT	27	8.4 (5.0-13.0)	64	7.8 (5.7-10.4)	64	8.0 (5.4-11.2)	23	5.8 (2.9-10.2)	27	5.9 (3.2-9.9)
	Vasopressor Use	88	23.9 (18.3-30.4)	172	20.1 (16.7-24.0)	186	20.4 (16.5-24.8)	77	15.0 (10.0-21.3)	71	11.2 (7.5-15.8)
	In-Hospital Death	36	9.9 (6.1-14.9)	98	10.7 (8.1-13.8)	95	11.1 (8.1-14.7)	26	6.5 (3.3-11.4)	36	6.8 (3.8-11.0)
	LOS[1] among alive	340	5.3 (2.2-15.2)	783	6.0 (2.7-13.1)	783	5.0 (2.4-10.7)	419	5.5 (2.5-10.3)	551	5.3 (2.5-8.8)
	LOS[1] among deaths	36	9.6 (4.7-18.3)	98	11.5 (4.5-21.0)	95	11.5 (6.3-20.4)	26	32.3 (11.6-40.5)	36	18.9 (11.0-28.2)
	LOS[1] among all	376	5.7 (2.3-15.4)	882	6.5 (2.9-14.0)	878	5.4 (2.5-12.0)	447	5.8 (2.6-11.4)	590	5.7 (2.7-9.8)
65+	N	460		1,303		1,184		406		629	
	ICU Admission	181	42.0 (35.5-48.6)	437	34.1 (30.6-37.6)	348	30.9 (26.7-35.3)	140	40.9 (32.4-49.8)	179	31.5 (25.9-37.6)
	Mechanical Vent	127	32.4 (26.4-38.9)	269	21.4 (18.5-24.6)	201	19.7 (16.1-23.7)	73	18.6 (12.5-26.2)	84	19.5 (14.7-25.1)
	CPAP/BIPAP	14	2.8 (1.1-5.7)*	70	5.5 (3.9-7.4)	101	6.9 (4.9-9.5)	23	6.0 (2.5-11.9)*	45	4.3 (2.5-7.0)
	HFNC	37	7.5 (4.5-11.7)	118	7.5 (5.8-9.7)	91	8.7 (6.3-11.7)	31	12.2 (6.6-19.9)	62	12.8 (8.9-17.6)
	RRT	22	5.4 (2.8-9.2)	66	6.3 (4.6-8.4)	63	6.2 (4.2-8.9)	19	7.0 (3.0-13.6)*	29	8.6 (5.2-13.2)
	Vasopressor Use	98	25.7 (20.1-31.9)	254	20.0 (17.2-23.1)	208	21.2 (17.5-25.3)	77	17.4 (11.7-24.3)	79	17.6 (13.0-23.0)
	In-Hospital Death	103	23.3 (18.0-29.3)	342	26.9 (23.7-30.3)	273	23.3 (19.6-27.3)	54	14.7 (9.3-21.7)	98	20.3 (15.6-25.8)
	LOS[1] among alive	354	9.8 (4.2-19.9)	955	7.4 (3.9-14.5)	888	6.3 (3.4-12.9)	350	7.3 (3.8-13.9)	529	5.2 (2.7-9.8)
	LOS[1] among deaths	103	8.1 (5.1-14.8)	342	7.7 (4.0-14.4)	273	7.0 (3.2-16.8)	54	12.7 (6.0-19.0)	98	12.6 (8.4-21.3)
	LOS[1] among all	459	9.3 (4.5-19.4)	1,298	7.5 (3.9-14.5)	1,163	6.5 (3.3-13.6)	405	8.2 (4.0-15.6)	627	6.2 (3.1-12.2)

Supplemental Table 4 continued…

Age Group (Years)	Variable	August		September		October		November		December		P value[2]
		N	Wtd % (95%CI)	N	Wtd % (95%CI)	N	Wtd % (95%CI)	N	Wtd % (95%CI)	N	Wtd % (95%CI)	
Overall	N	1,823		1,472		901		1,429		855		
	ICU Admission	410	21.4 (18.2-24.9)	345	22.3 (18.6-26.4)	184	21.7 (18.2-25.5)	294	21.1 (18.8-23.6)	163	20.5 (17.1-24.3)	<.001
	Mechanical Vent	171	10.2 (7.8-13.1)	151	10.2 (7.5-13.4)	76	8.7 (6.4-11.5)	154	10.8 (9.1-12.7)	97	12.3 (9.6-15.3)	<.001
	CPAP/BIPAP	118	6.1 (4.3-8.3)	93	4.5 (3.1-6.4)	53	7.0 (4.9-9.8)	112	8.1 (6.6-9.9)	60	7.5 (5.4-10.1)	<.001
	HFNC	121	7.5 (5.4-9.9)	101	6.9 (4.7-9.8)	92	10.3 (7.9-13.2)	131	9.5 (7.8-11.3)	69	8.7 (6.6-11.2)	0.018
	RRT	70	6.4 (4.5-8.8)	46	4.9 (2.8-7.9)	37	4.1 (2.6-6.2)	73	5.4 (4.1-6.9)	52	6.1 (4.4-8.2)	0.484
	Vasopressor Use	167	9.9 (7.5-12.7)	147	10.7 (7.9-14.1)	83	8.8 (6.6-11.4)	150	10.9 (9.1-12.9)	95	12.8 (10.0-16.0)	<.001
	In-Hospital Death	123	8.9 (6.7-11.6)	118	9.0 (6.6-12.1)	71	8.7 (6.5-11.5)	119	10.1 (8.3-12.1)	89	11.9 (9.2-15.1)	<.001
	LOS[1] among alive	1,692	4.3 (2.1-7.8)	1,343	4.0 (1.9-7.2)	812	4.3 (2.0-7.6)	1,294	4.4 (2.3-8.5)	740	4.3 (2.0-8.4)	<.001
	LOS[1] among deaths	123	14.1 (5.0-21.7)	118	12.1 (7.0-19.8)	71	11.5 (7.2-16.8)	119	10.1 (4.4-18.2)	89	9.7 (5.3-18.7)	<.001
	LOS[1] among all	1,820	4.6 (2.3-8.6)	1,466	4.4 (2.0-8.1)	894	4.6 (2.1-8.6)	1,421	4.7 (2.4-9.4)	844	4.6 (2.2-9.0)	<.001
18-49	N	711		555		275		417		242		
	ICU Admission	133	18.0 (12.9-24.2)	92	15.9 (10.5-22.7)	41	13.6 (9.3-19.0)	70	17.0 (13.4-21.2)	43	19.0 (13.6-25.5)	<.001
	Mechanical Vent	43	7.0 (3.8-11.8)	36	6.4 (3.4-10.7)	15	5.4 (2.6-9.9)*	39	9.8 (7.0-13.3)	22	9.5 (5.8-14.5)	<.001
	CPAP/BIPAP	42	6.4 (3.3-11.1)	19	1.7 (0.8-3.2)	7	1.7 (0.5-4.1)*	21	4.6 (2.8-7.1)	10	3.9 (1.7-7.6)*	0.016
	HFNC	30	5.1 (2.4-9.2)*	28	4.6 (2.0-8.8)*	20	7.6 (4.1-12.5)	32	7.4 (5.0-10.6)	14	6.8 (3.4-11.9)	0.566
	RRT	11	1.0 (0.3-2.5)*	13	3.0 (0.9-7.2)*	8	2.2 (0.7-5.1)*	13	3.2 (1.7-5.5)	15	7.8 (4.1-13.1)	<.001
	Vasopressor Use	35	4.6 (2.2-	34	7.1 (3.4-	17	4.4 (2.3-	32	7.9 (5.3-	22	9.5 (5.7-	<.001

			8.4)*		12.6)*		7.6)		11.1)		14.7)	
	In-Hospital Death	9	1.0 (0.3-2.5)*	13	2.2 (0.8-5.0)*	5	1.9 (0.5-4.6)*	10	2.1 (1.0-4.0)*	8	2.4 (0.8-5.2)*	0.376
	LOS[1] among alive	696	3.2 (1.7-6.3)	536	2.9 (1.4-5.7)	269	2.9 (1.6-5.3)	404	3.4 (1.7-6.5)	228	3.8 (1.7-8.0)	<.001
	LOS[1] among deaths	9	14.6 (4.2-16.3)	13	(4.8-26.4)	5	1.8 (1.0-10.8)*	10	11.4 (5.3-17.4)*	8	8.0 (1.3-13.4)*	<.001
	LOS[1] among all	709	3.3 (1.7-6.4)	551	3.0 (1.4-5.9)	275	2.9 (1.5-5.3)	414	3.5 (1.8-7.0)	241	3.7 (1.7-8.0)	<.001
50-64	N	483		396		312		526		276		
	ICU Admission	136	24.6 (18.3-31.9)	109	25.6 (18.6-33.6)	73	22.8 (16.9-29.7)	118	22.2 (18.6-26.1)	51	19.7 (14.7-25.5)	<.001
	Mechanical Vent	59	10.3 (6.1-16.1)	48	12.4 (7.0-20.0)	32	9.4 (5.9-14.1)	64	11.8 (9.2-14.9)	28	11.2 (7.4-16.1)	<.001
	CPAP/BIPAP	28	5.0 (2.2-9.6)*	33	7.1 (3.5-12.5)*	15	3.9 (1.8-7.2)*	41	7.3 (5.2-9.8)	18	6.9 (4.0-11.1)	0.007
	HFNC	45	7.8 (4.1-13.4)	34	8.7 (4.4-15.0)	35	10.6 (6.4-16.2)	58	11.5 (8.8-14.7)	24	9.6 (6.1-14.2)	0.053
	RRT	30	8.6 (4.5-14.4)	9	1.5 (0.5-3.4)*	18	6.9 (3.5-12.1)	37	7.3 (5.2-10.0)	22	8.1 (5.1-12.3)	0.051
	Vasopressor Use	63	11.8 (7.2-18.0)	51	12.3 (7.2-19.1)	36	10.6 (6.9-15.4)	63	11.7 (9.0-14.8)	27	11.5 (7.5-16.6)	<.001
	In-Hospital Death	29	4.5 (1.9-8.9)*	20	3.7 (1.7-6.8)*	20	6.9 (3.6-11.7)	35	6.8 (4.7-9.4)	24	9.2 (5.8-13.7)	0.013
	LOS[1] among alive	452	4.4 (2.4-9.0)	372	4.8 (2.7-7.8)	283	4.9 (2.9-7.6)	487	4.5 (2.5-8.1)	245	3.8 (1.8-7.5)	<.001
	LOS[1] among deaths	29	22.8 (17.6-42.9)	20	19.5* (7.0-43.9)	20	15.8 (6.2-18.3)	35	12.4 (6.1-23.0)	24	13.3 (4.0-21.4)	<.001
	LOS[1] among all	482	4.6 (2.5-9.7)	394	5.0 (2.7-8.1)	309	5.1 (2.9-8.3)	525	4.6 (2.5-8.9)	273	4.0 (1.9-8.6)	<.001
65+	N	629		521		314		486		337		
	ICU Admission	141	22.0 (16.8-27.8)	144	25.1 (18.8-32.4)	70	25.8 (19.7-32.6)	106	22.4 (18.6-26.6)	69	21.6 (16.2-27.8)	<.001
	Mechanical Vent	69	12.7 (8.5-17.9)	67	11.7 (7.2-17.7)	29	10.3 (6.3-15.5)	51	10.7 (8.0-14.0)	47	13.9 (9.7-19.1)	<.001
	CPAP/BIPAP	48	6.5 (4.0-10.0)	41	5.1 (2.8-8.4)	31	12.2 (7.8-17.9)	50	10.1 (7.5-13.3)	32	9.2 (5.8-13.8)	0.005
	HFNC	46	9.1 (5.7-13.6)	39	7.7 (3.9-13.4)	37	11.8 (7.8-17.0)	41	9.3 (6.6-12.5)	31	9.0 (5.9-13.0)	0.325
	RRT	29	9.2 (5.7-14.0)	24	8.7 (4.2-15.5)*	11	3.5 (1.4-7.1)*	23	5.3 (3.3-8.1)	15	4.4 (2.2-7.6)	0.263

	Vasopressor Use	69	12.8 (8.6-18.1)	62	12.6 (7.8-18.9)	30	10.3 (6.5-15.3)	55	11.8 (8.9-15.2)	46	14.7 (10.2-20.3)	<.001
	In-Hospital Death	85	17.9 (13.1-23.5)	85	17.5 (12.1-24.1)	46	14.0 (9.7-19.3)	74	15.5 (12.2-19.2)	57	17.2 (12.6-22.8)	<.001
	LOS[1] among alive	544	5.0 (2.6-8.4)	435	4.6 (2.3-7.9)	260	5.0 (2.1-10.2)	403	5.0 (2.6-10.0)	267	4.9 (2.5-8.9)	<.001
	LOS[1] among deaths	85	12.4 (4.6-19.7)	85	11.2 (7.2-17.4)	46	11.4 (7.6-16.0)	74	9.1 (4.2-17.4)	57	8.9 (5.4-16.7)	<.001
	LOS[1] among all	629	5.4 (2.9-9.9)	521	5.3 (2.5-9.7)	310	5.7 (2.5-11.3)	482	5.4 (2.8-11.0)	330	5.5 (2.8-9.6)	<.001

Wtd %= Weighted percentage; ICU= Intensive care unit; Mechanical Vent= Invasive Mechanical Ventilation; CPAP/BIPAP = continuous positive airway pressure/bilevel positive airway pressure; HFNC = High Flow Nasal Cannula; RRT= Renal Replacement Therapy; LOS = Hospital length of stay: LOS among alive = length of stay among cases discharged alive; LOS among deaths= length of stay among cases who died in-hospital; LOS among all = length of stay among all cases including those discharged alive and those who died in-hospital

*Relative standard error >30%

1 Median and Interquartile range presented for LOS

2 Logistic regression models were used to test the statistical significance of monthly trends in interventions/outcomes by assigning MMWR month as a single continuous predictor in models for all ages combined and for each individual age group strata. Median lengths of stay were compared across months using the Mann-Whitney-U test.

Supplemental Table 5. Percentage with Clinical Interventions and Outcomes among Adults with Laboratory-Confirmed COVID-19-Associated Hospitalizations by Race and Ethnicity, Age Group and Quarter, COVID-NET, March-December 2020

Age Group (years)	Intervention/Outcome	March-May		June-September		October-December		P value[1]
		Unweighted N	Weighted Percent (95% CI)	Unweighted N	Weighted Percent (95% CI)	Unweighted N	Weighted Percent (95% CI)	
Non-Hispanic White								
18-49	N	685		700		277		
	ICU Admission	185	29.7 (23.5-36.5)	117	15.9 (11.2-21.6)	41	16.5 (11.4-22.8)	0.008
	Mechanical Ventilation	100	15.2 (10.7-20.8)	42	5.5 (3.1-9.0)	21	8.9 (5.3-14.0)	0.002
	In-Hospital Death	31	3.2 (1.6-5.7)	9	0.9 (0.4-1.9)*	3	1.5 (0.3-4.3)*	0.028
	Length of stay in hospital	681	4.5 (2.3-10.7)	699	2.8 (1.3-5.3)	276	3.3 (1.6-5.9)	<.001
	Symptom onset to admit (days)	681	5.5 (2.2-7.0)	699	4.7 (2.4-7.3)	276	6.3 (2.6-8.1)	<.001
50-64	N	776		744		520		
	ICU Admission	275	34.9 (29.9-40.2)	190	25.4 (20.2-31.1)	109	19.1 (15.3-23.5)	<.001
	Mechanical Ventilation	165	20.8 (16.7-25.4)	79	8.8 (5.8-12.7)	55	9.6 (7.0-12.9)	<.001
	In-Hospital Death	75	9.2 (6.4-12.8)	28	3.7 (1.8-6.7)*	32	6.1 (3.9-9.0)	0.025
	Length of stay in hospital	776	5.5 (2.6-12.9)	738	5.1 (2.6-8.8)	517	4.3 (2.2-8.7)	<.001
	Symptom onset to admit (days)	776	6.1 (2.6-8.4)	738	5.9 (2.8-8.3)	517	5.4 (2.4-7.6)	<.001
65+	N	1,747		1,262		758		
	ICU Admission	502	30.4 (27.2-33.8)	293	23.2 (19.4-27.3)	146	19.4 (16.0-23.1)	<.001
	Mechanical Ventilation	272	18.0 (15.3-20.9)	126	12.5 (9.4-16.1)	68	8.9 (6.7-11.6)	<.001
	In-Hospital Death	437	27.5 (24.4-30.9)	164	16.4 (13.1-20.2)	108	14.1 (11.2-17.3)	<.001
	Length of stay in hospital	1,728	7.5 (3.8-14.4)	1,261	5.8 (3.1-10.7)	750	5.2 (2.6-9.7)	<.001
	Symptom onset to admit (days)	1,728	3.0 (1.0-6.6)	1,261	3.6 (1.2-6.7)	750	4.4 (1.9-6.9)	<.001

Non-Hispanic Black								
18-49	N	848		716		214		
	ICU Admission	208	23.2 (18.5-28.5)	104	14.2 (9.8-19.5)	24	11.9 (6.9-18.7)	0.005
	Mechanical Ventilation	107	12.3 (8.8-16.7)	38	5.3 (2.7-9.2)	13	7.9 (3.8-14.2)*	0.026
	In-Hospital Death	22	3.1 (1.3-6.1)*	11	0.9 (0.3-2.2)*	3	1.3 (0.2-3.9)*	0.101
	Length of stay (median, IQR)	848	4.1 (2.0-7.4)	710	3.2 (1.6-6.0)	213	2.9 (1.4-5.8)	<.001
	Days from symptom onset to admission (median, IQR)	848	4.6 (2.2-6.8)	710	4.3 (2.0-6.8)	213	5.3 (2.8-7.9)	<.001
50-64	N	673		430		251		
	ICU Admission	214	29.7 (25.2-34.5)	110	22.0 (16.3-28.7)	48	19.4 (14.1-25.8)	0.016
	Mechanical Ventilation	141	20.5 (16.7-24.8)	55	11.3 (7.1-16.8)	26	10.9 (6.8-16.3)	0.002
	In-Hospital Death	62	10.7 (7.7-14.3)	26	5.4 (2.6-9.7)*	20	9.4 (5.5-14.6)	0.128
	Length of stay (median, IQR)	672	5.2 (2.5-11.4)	428	5.4 (2.9-9.9)	249	4.3 (2.3-7.9)	<.001
	Days from symptom onset to admission (median, IQR)	672	5.0 (2.4-6.9)	428	4.6 (2.5-6.6)	249	4.6 (2.4-6.9)	0.020
65+	N	712		378		152		
	ICU Admission	260	37.9 (33.2-42.7)	111	32.3 (25.3-39.8)	32	21.2 (13.4-31.0)	0.010
	Mechanical Ventilation	182	26.0 (21.8-30.5)	63	17.7 (12.2-24.4)	18	11.8 (6.0-20.1)	0.005
	In-Hospital Death	154	21.9 (18.1-26.2)	62	19.1 (13.5-25.8)	21	13.6 (7.5-21.9)	0.175
	Length of stay (median, IQR)	710	7.3 (4.2-15.9)	378	7.0 (3.7-13.2)	150	5.7 (2.7-10.0)	<.001
	Days from symptom onset to admission (median, IQR)	710	3.3 (1.2-6.7)	378	3.3 (1.3-6.6)	150	3.3 (1.2-6.3)	0.003
Hispanic or Latino								
18-49	N	1,183		1,021		292		
	ICU Admission	327	24.2 (20.3-28.6)	201	20.2 (15.8-25.1)	63	21.7 (16.1-28.2)	0.411
	Mechanical Ventilation	183	14.0 (10.8-17.7)	85	8.0 (5.3-11.5)	29	9.4 (5.8-14.2)	0.027

	In-Hospital Death	27	2.9 (1.5-5.2)	15	2.6 (1.0-5.7)*	11	2.9 (1.3-5.6)*	0.970
	Length of stay (median, IQR)	1,181	4.4 (2.1-8.8)	1,020	3.3 (1.7-6.4)	292	3.7 (1.8-7.9)	<.001
	Days from symptom onset to admission (median, IQR)	1,181	6.1 (2.9-7.8)	1,020	5.0 (2.3-7.0)	292	5.5 (2.8-8.5)	<.001
50-64	N	424		464		224		
	ICU Admission	179	44.5 (37.8-51.3)	163	32.4 (25.7-39.7)	52	25.8 (18.8-33.8)	0.001
	Mechanical Ventilation	127	33.4 (27.1-40.1)	83	17.8 (12.3-24.4)	27	14.7 (9.1-21.9)	<.001
	In-Hospital Death	52	12.9 (8.7-18.1)	30	6.6 (3.3-11.8)*	19	10.9 (6.0-17.7)	0.161
	Length of stay (median, IQR)	424	7.9 (3.3-19.0)	464	5.6 (2.7-10.6)	222	4.6 (2.3-9.8)	<.001
	Days from symptom onset to admission (median, IQR)	424	6.0 (2.9-8.3)	464	5.6 (2.8-7.9)	222	4.7 (2.3-7.3)	<.001
65+	N	213		260		111		
	ICU Admission	89	35.6 (27.3-44.6)	98	38.2 (29.0-48.1)	34	37.2 (25.2-50.5)**	0.919
	Mechanical Ventilation	67	29.1 (21.3-37.9)	59	25.8 (17.6-35.4)	22	25.6 (16.2-37.1)**	0.815
	In-Hospital Death	50	19.7 (13.2-27.7)	53	25.1 (17.1-34.5)	24	26.6 (17.1-38.0)**	0.470
	Length of stay (median, IQR)	211	6.8 (3.5-17.0)	258	6.2 (2.5-14.9)	108	6.0 (3.1-14.5)	0.001
	Days from symptom onset to admission (median, IQR)	211	5.5 (2.8-6.9)	258	3.8 (2.1-6.8)	108	5.0 (1.8-6.7)	<.001

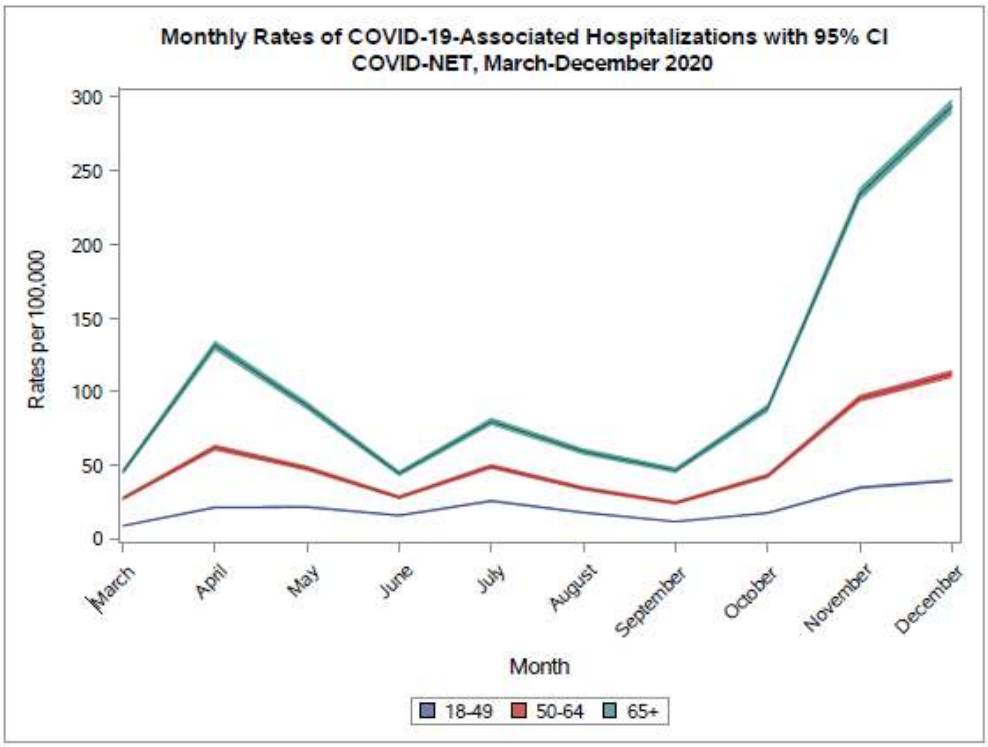
*Relative standard error >30%

**Confidence interval width >20

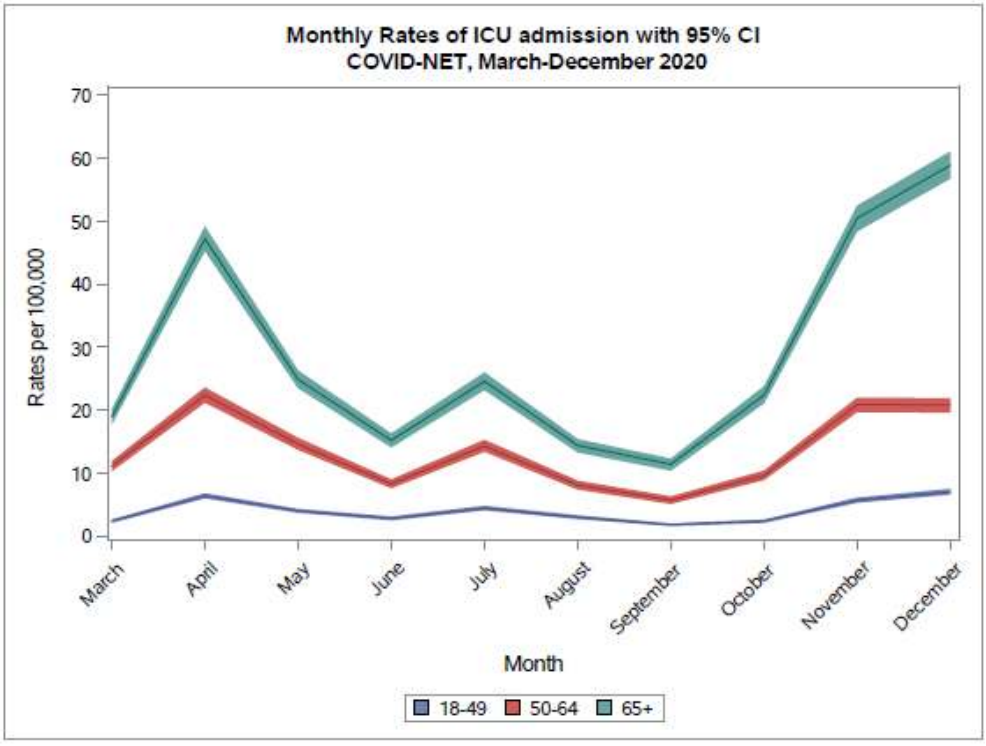
1 Logistic regression models were used to test the statistical significance of trends in outcomes over time by assigning monthly groupings (March-May, June-September, October-December) as a single continuous predictor in models for each age by race strata. Median lengths of stay and days from symptom onset to admission were compared across months using the Mann-Whitney-U test.

Supplemental Figure 1. Rates of Hospitalization, Intensive Care Unit Admission and In-Hospital Death by Age Group and Month, COVID-NET, March-December 2020

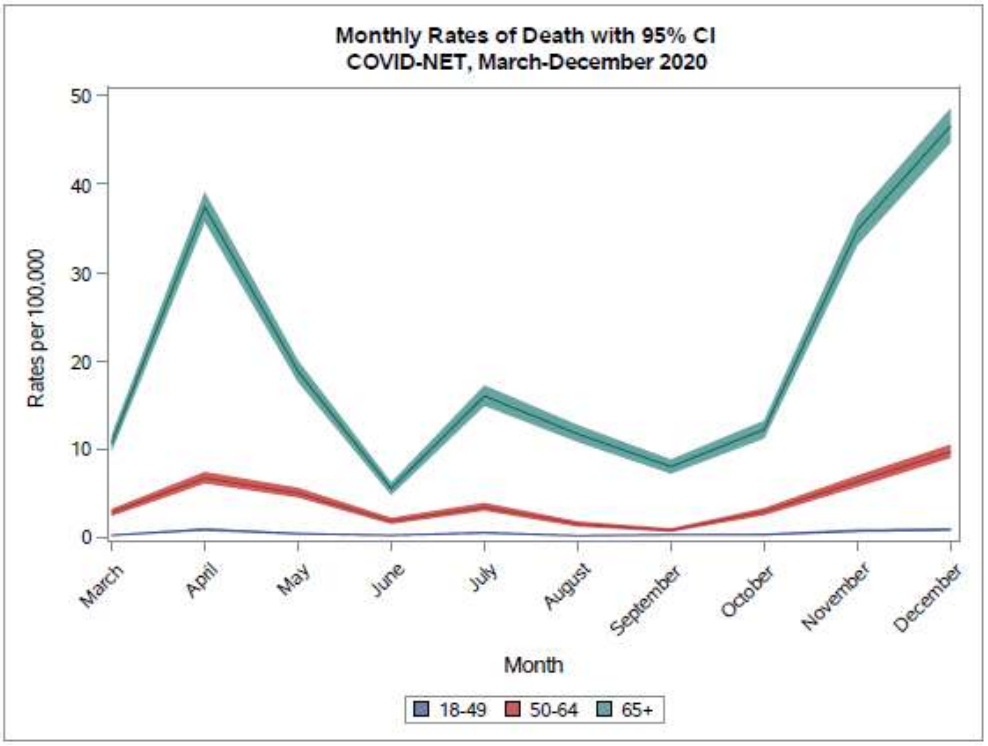
1A. Hospitalizations[1]



1B. Intensive Care Unit Admissions[2]



1C. In-Hospital Deaths[2]



1. Unadjusted hospitalization rates per 100,000 population were calculated by taking the total number of cases each month, divided by the National Center for Health Statistics' vintage 2019 bridge-race postcensal population estimates for the counties included in surveillance.
2. Unadjusted ICU admission and death rates among hospitalized patients were calculated using the weighted number of sampled cases per month with each outcome as the numerator, divided by the National Center for Health Statistics' vintage 2019 bridge-race postcensal population estimates for the counties included in surveillance.