Geographic Variation in Use of Oxygen Support

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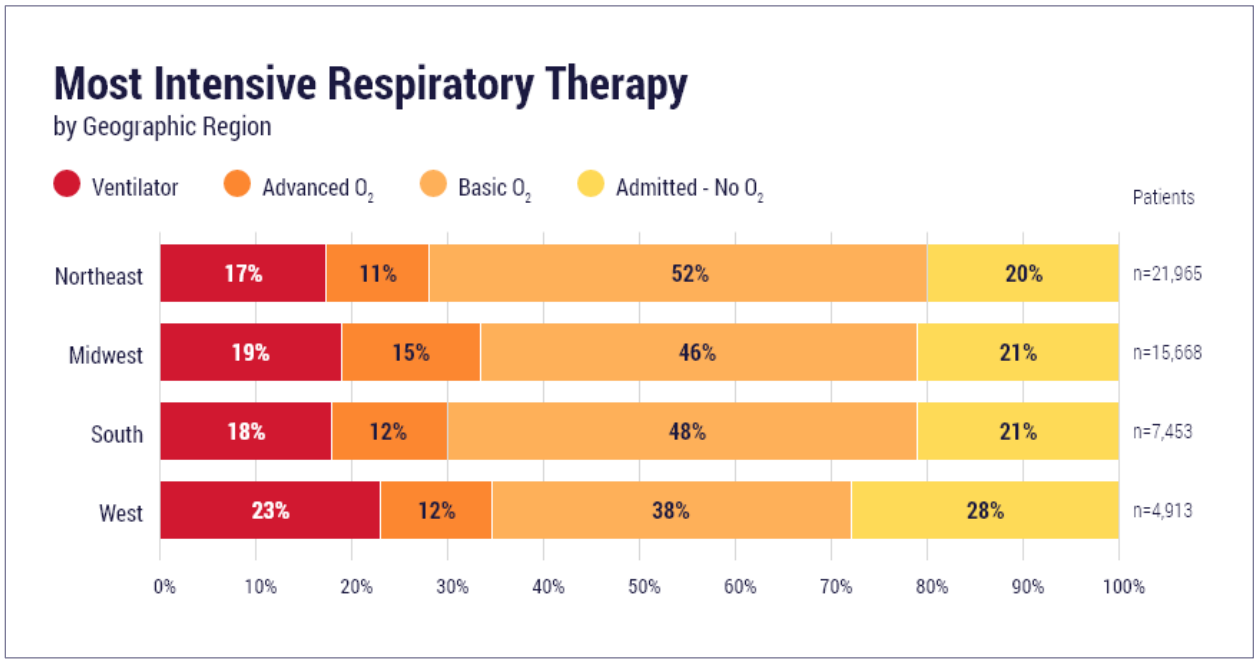
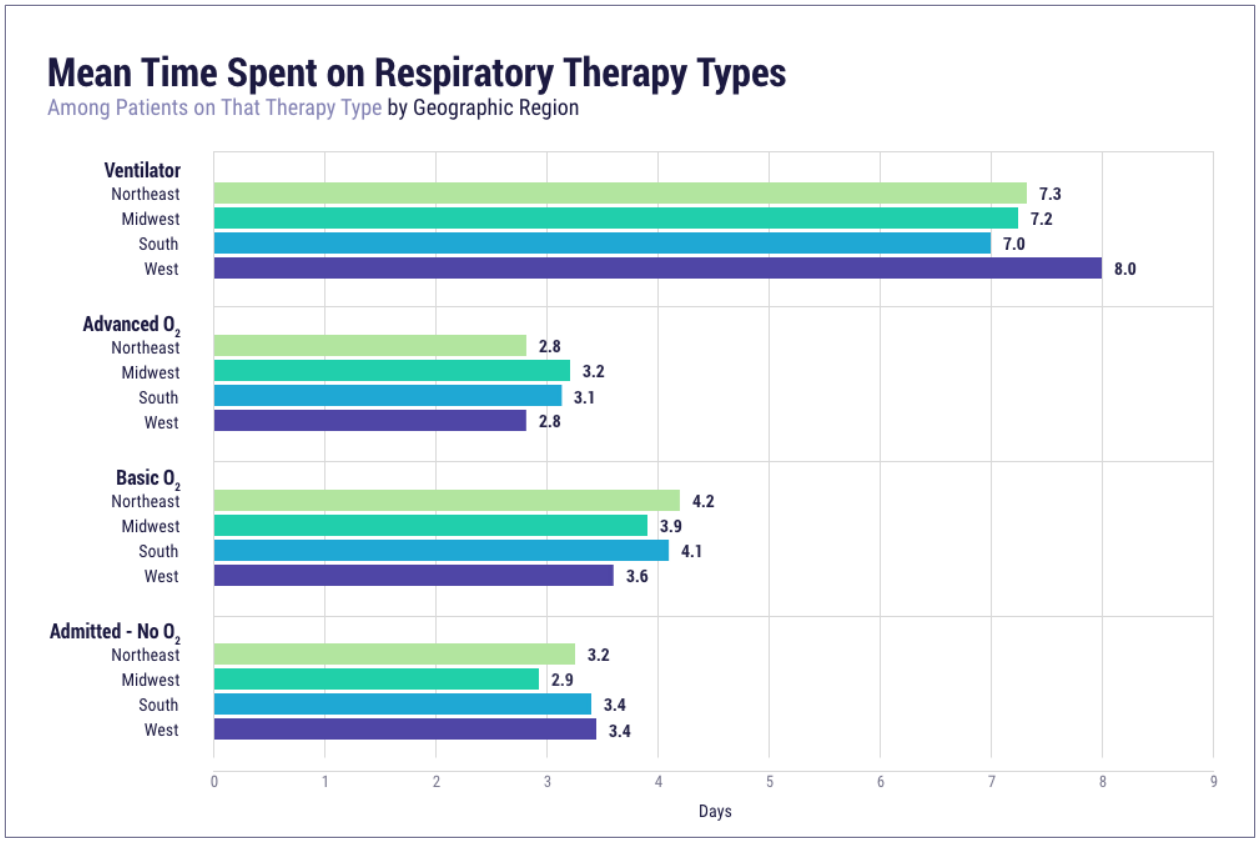
Using data from nearly 50,000 hospitalized COVID-19 positive patients across the United States, statistically significant geographic variations in supportive oxygen treatment were demonstrated and not explained by differences in age, sex, or severity.

Based on Census Bureau region definitions, mechanical ventilation was most frequently used in the West, advanced oxygen support in the Midwest, and basic oxygen support in the Northeast compared to the other regions. Supportive oxygen treatment was measured in two ways: the most intensive respiratory therapy received throughout a patient's treatment and by average duration of treatment among patients receiving that respiratory therapy.





When high-quality evidence for treatment effectiveness does not exist, factors other than patient outcome such as local resource availability dictate practice conventions. Amid uncertainty in treatment efficacy, historic resource availability may determine the method of oxygen support employed in treatment and contribute to the identified geographic variations. Timing of peak admissions in each geographic region could contribute to variation as well, in that clinicians nationwide may have adapted treatments based on experience and evolving evidence.

As further understanding of treatment efficacy evolves, practice recommendations should be refined to ensure optimal patient outcomes. Intentional dissemination of these recommendations and encouragement towards adherence is required to reduce practice variation across the country to provide the best value of healthcare.

This summary includes all patients hospitalized for COVID-19 as of June 16, 2020.

Data are pooled from 43 healthcare organizations representing 290 hospitals that span 21 states and cover 49,999 hospitalized patients.

DATA DEFINITIONS

Term	Definition
Ventilator Usage	A patient is considered to be on a ventilator if there is documentation other than "Off" or a non-invasive mode (e.g., CPAP, BiPAP) in a Vent Mode flowsheet row, or an oxygen delivery device of ventilator. Alternatively, a patient is considered to be on a ventilator if they have a procedure with one of the following CPT codes during their COVID-19 related admissions and are not indicated to have received oxygen with a flow rate at or above 30 lpm or using a non-invasive ventilator mode or high flow oxygen delivery device (regardless of flow rate) that includes BiPAP, high-flow nasal cannula, T-piece, blow-by, or CPAP if administered between 8 AM and 9 PM (to exclude patients who were on nightly CPAP for apnea). **CPT Codes:** 94002, 94003
Advanced Respiratory Support	A patient with an oxygen flow rate at or above 30 lpm or using a non-invasive ventilator mode or high flow oxygen delivery device (regardless of flow rate) that includes BiPAP, high-flow nasal cannula, T-piece, blow-by, or CPAP if administered between 8am-9pm (to exclude patients who were on nightly CPAP for apnea).
Basic Respiratory Support	A patient on supplementary oxygen with a flow rate under 30 lpm, or using any oxygen delivery device that is not a ventilator or high-flow oxygen device (e.g., ETT, LMA, CPAP, BiPAP, high-flow nasal cannula, T-piece, or blow-by).
Northeast Region	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
Midwest Region	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin
South Region	Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia
West Region	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

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Check for updates at:
https://ehrn.org/wp-content/uploads/Geographic-Variation-Oxygen-Support.pdf