



# Length of Hospitalization and Outcomes of Coronavirus Disease 2019 (COVID-19) in Tennessee – Preliminary Report

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## Purpose

To determine if age, sex, race, Intensive Care Unit (ICU) admission, nursing home residency, Body Mass Index (BMI) and underlying medical conditions have an influence on the length of coronavirus disease-2019 (COVID-19) associated hospitalizations and deaths among an 8-county catchment area population in Tennessee (TN).

## Background

- A new coronavirus, severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), was first identified in China in December 2019
- COVID-19 cases and deaths as of August 31,
  - ~25 million cases and ~840,000 deaths worldwide
  - ~6 million cases and ~180,000 deaths in the United States
  - ~150,000 cases and ~1,700 deaths in Tennessee
- Comprehensive data on patients with severe COVID-19 infections are needed to better understand high-risk groups with poor outcomes and to develop prevention efforts and future interventions

## Methods

Population	Outcome	Analysis
<ul style="list-style-type: none"> <li>Data collected by the TN Coronavirus Disease 2019-Associated Hospitalization Surveillance Network (COVID-NET) was used</li> <li>Catchment area: Davidson and 7 surrounding counties (1,767,209 people) in TN</li> <li>Laboratory-confirmed COVID-19 hospitalizations during March 1–June 30, 2020</li> </ul>	<ul style="list-style-type: none"> <li>Length of hospital stay (LOS)</li> <li>Death</li> </ul>	<ul style="list-style-type: none"> <li>Quantile regression models (model median) and Proportional odds regression models (&lt;1 day, 1-7 days, 8-14 days, 15-30 days, &gt;30 days) were performed for LOS</li> <li>Multiple logistic regression model was performed for the binary death outcome</li> </ul>

## Results

Table 1: Demographic Characteristics

Characteristic	Percentage (%)	Characteristic	Percentage (%)
N=1,488			
<b>Age Group</b>		<b>Nursing Home Resident</b>	
0-17	1%	Yes	17%
18-29	6%	No	83%
30-39	10%	<b>BMI<sup>a</sup></b>	
40-49	15%	Underweight (<18.5)	3%
50-64	29%	Healthy weight (18.5-24.9)	21%
65-74	18%	Overweight (25.0-29.9)	24%
75+	22%	Obese (30-40)	33%
<b>Sex</b>		Severely obese (>40)	12%
Male	52%	<b>Underlying Medical Conditions*</b>	
Female	48%	Yes	77%
<b>Race</b>		No	23%
Non-Hispanic White	41%	<b>ICU Admission</b>	
Non-Hispanic Black	28%	Yes	32%
Hispanic	23%	No	68%
Other/Unknown/Missing	9%		

<sup>a</sup>BMI is not collected for children and pregnant women

\*chronic lung disease, chronic metabolic disease, cardiovascular disease, neurological disorders, immunocompromised condition, renal disease, blood disorders/hemoglobinopathy, history of Guillain-Barre Syndrome, liver disease, rheumatologic/ autoimmune/inflammatory conditions and other conditions

Table 2: Quantile Regression Model Results\*

Risk Factor	Estimate	p-value
<b>Age</b>	0.05	<0.001
<b>Sex</b>		
Female	-0.24	0.392
<b>Race</b>		
Non-Hispanic Black	-0.11	0.776
Hispanic	-0.11	0.741
<b>Nursing Home Resident</b>		
Yes	-0.90	0.330
<b>Number of Underlying Medical Conditions</b>	0.16	0.278
<b>ICU Admission</b>		
Yes	6.46	<0.001
<b>Discharged to Nursing home</b>		
Yes	7.43	<0.001

\*Model on the median of LOS (as continuous variable)

BMI was calculated for non-pregnant adults, statistically non-significant

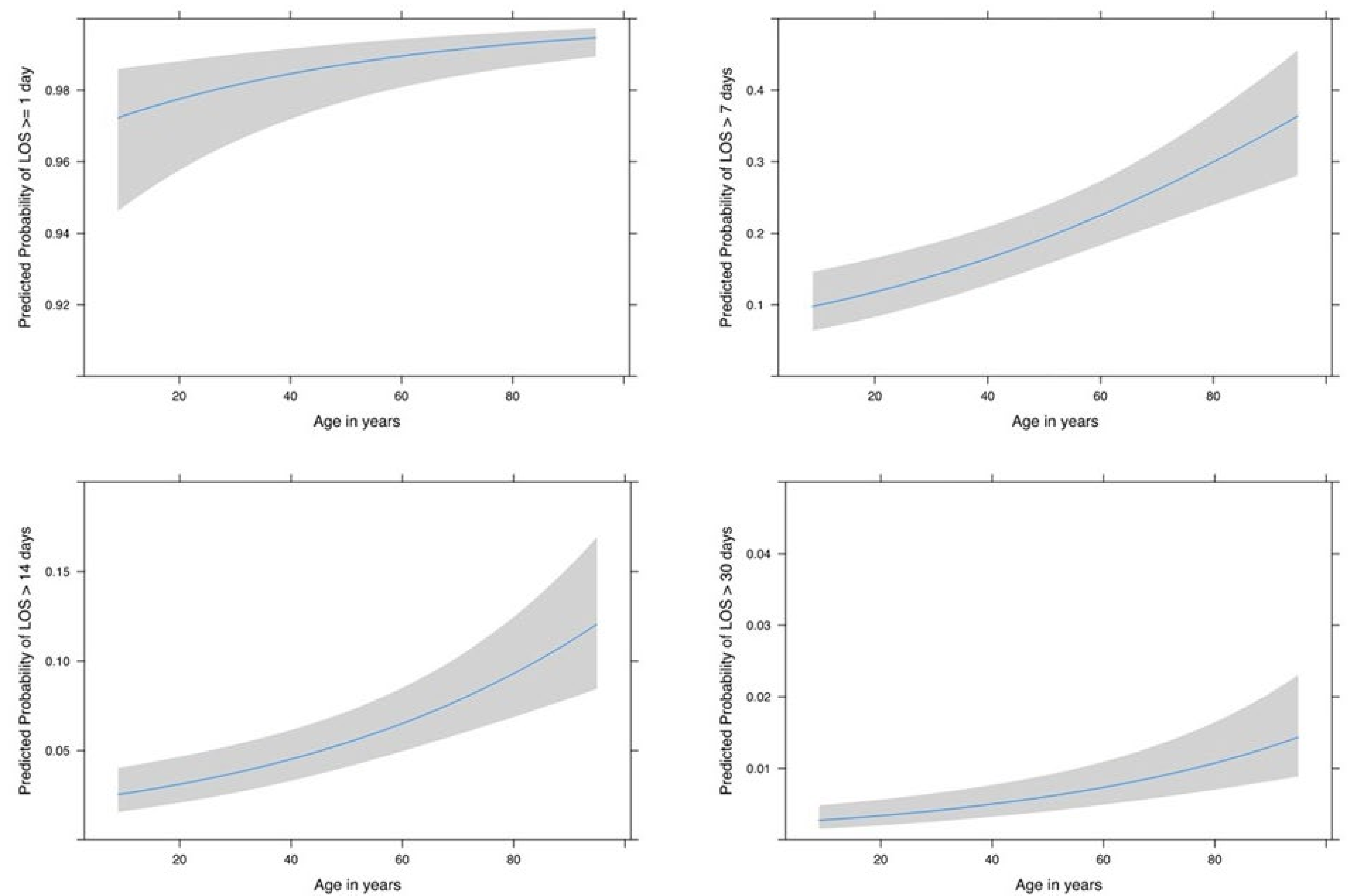
## Results - continued

Table 3: Logistic Regression Model Results

Risk Factor	Outcome					
	OR	LOS*		OR	Death	
		Lower	Upper		Lower	Upper
<b>Age (1-year increase)</b>	1.02	1.01	1.03	1.08	1.06	1.10
<b>Sex</b>						
Female:Male	0.85	0.68	1.06	0.63	0.42	0.95
<b>Race</b>						
Non-Hispanic Black:Non-Hispanic White	1.13	0.87	1.47	1.04	0.65	1.67
Hispanic:Non-Hispanic White	1.05	0.76	1.46	2.38	1.30	4.34
<b>Nursing Home Resident</b>						
Yes:No	0.99	0.69	1.41	1.69	1.01	2.82
<b>Number of Underlying Medical Conditions</b>	1.11	1.02	1.21	1.12	0.97	1.30
<b>ICU Admission</b>						
Yes:No	6.47	5.04	8.30	16.04	10.07	25.56
<b>Discharged to Nursing Home</b>						
Yes:No	5.03	3.51	7.21	n/a	n/a	n/a

\*LOS as five level ordinal variable, <1 day, 1-7 days, 8-14 days, 15-30 days, >30 days  
BMI was calculated for non-pregnant adults, statistically non-significant

Figure: Predicted Probability of LOS with Increase in Age



## Limitations

- Analysis only included hospitalizations through June 30, 2020 - results may not be representative of the entire TN COVID-NET population
- Not all COVID-19-associated hospitalizations may have been captured because of the lack of widespread testing capability, especially early on in the outbreak

## Conclusions

- Older adults admitted to the ICU with pre-existing conditions had a prolonged hospital admission.
- Older Hispanic males admitted to the ICU had significantly higher death rates compared to others in their cohort.
- BMI showed no significant influence on length of hospitalization and death.
- Nursing homes commonly required at least two negative COVID-19 test results prior to accepting a patient which may have extended the length of stay in this group.
- These results highlight prolonged hospital stays and higher mortality rates for older adults with pre-existing conditions.

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