

## Introduction

- The COVID-19 pandemic strained ICU capacity, staffing, and medication supplies<sup>1</sup>
- Most research has focused on COVID-19; with less known about the impacts on non-COVID on patients
- Ventilated non-COVID patients may have experienced altered care during COVID surges<sup>2,3</sup>
- Understanding these effects is key to improving crisis preparedness

### Objectives

- Primary:** Assess the link between ICU COVID-19 burden and mortality in ventilated non-COVID patients
- Secondary:** Compare sedative drug charges in high vs. low COVID burden periods for non-COVID ICU patients

## Methods

### Design

- University of Pittsburgh Medical Center (UPMC) EHR
- Study Period: March 2020 – December 2022
- Exposure defined at the ICU-month level:
  - High COVID-19 period: ≥50% of ventilated patients had COVID-19
  - Low COVID-19 period: <50% of ventilated patients had COVID-19
- Sedative charges were estimated using 2023 UPMC chargemaster median rates for five agents: dexmedetomidine, ketamine, fentanyl, propofol, and midazolam

### Statistical Analyses

- ICU Mortality
  - Model: Mixed-effects logistic regression with random intercepts for hospital and patients
- Sedative Charges
  - Model: Two-part model
    - Logistic regression to model any positive sedative charge
    - Generalized Linear Model (GLM) with gamma distribution and log link to model charges among users

### Covariates Included

- ICU type, GOSSIS, sex, age, race, duration of mechanical ventilation (DMV), ICU length of stay (LOS), total number of sedatives used, and high influenza activity

## Results

During periods of high COVID-19:

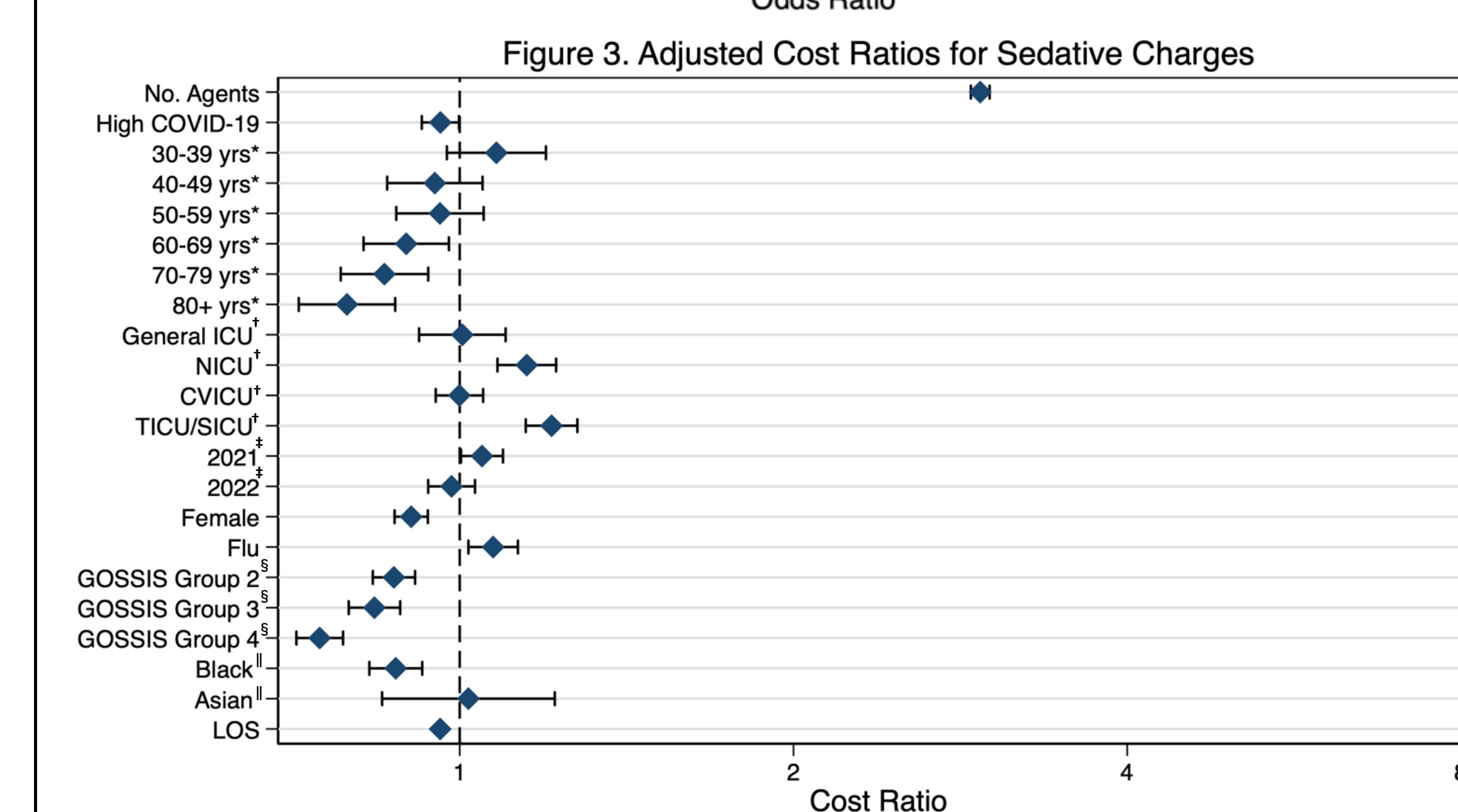
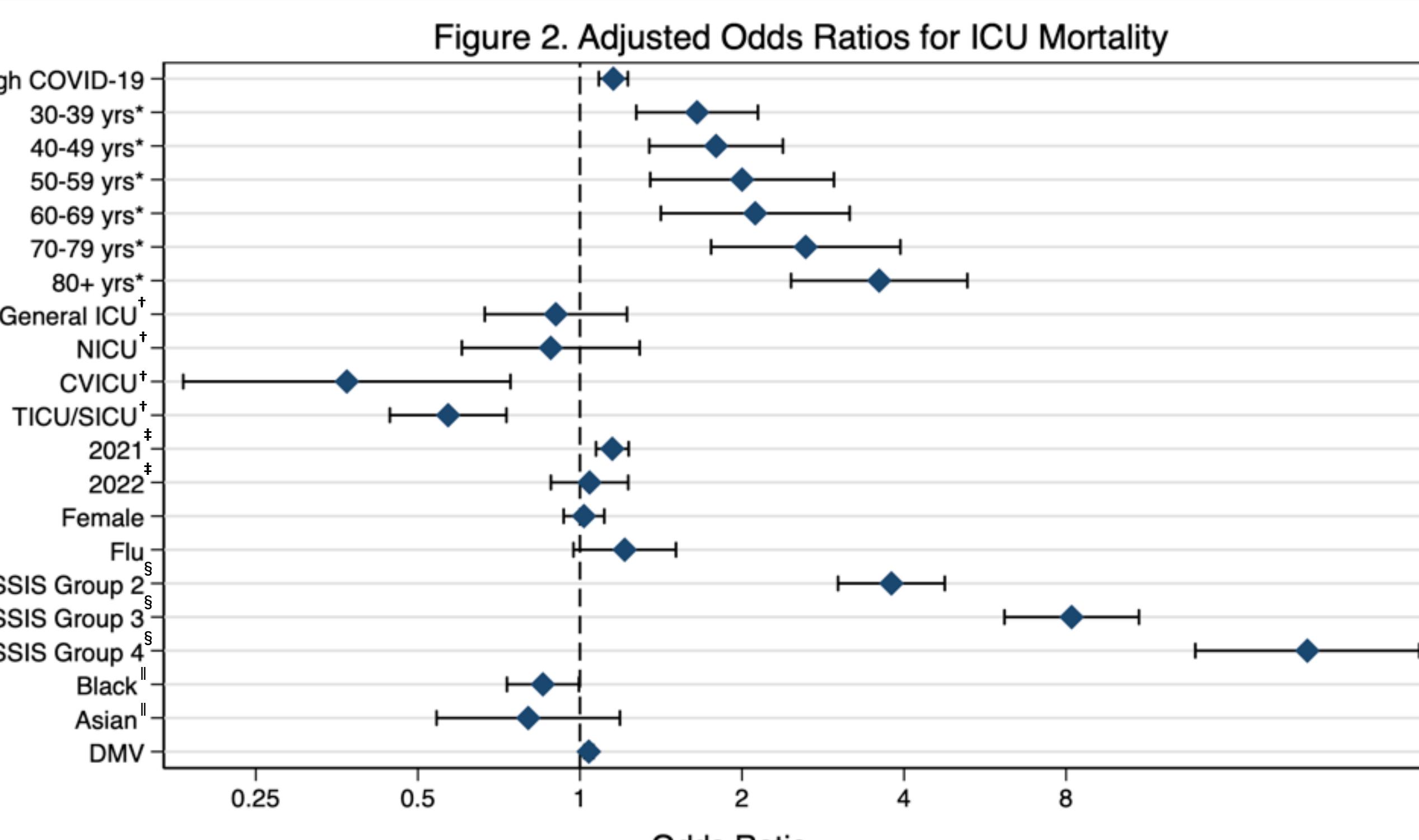
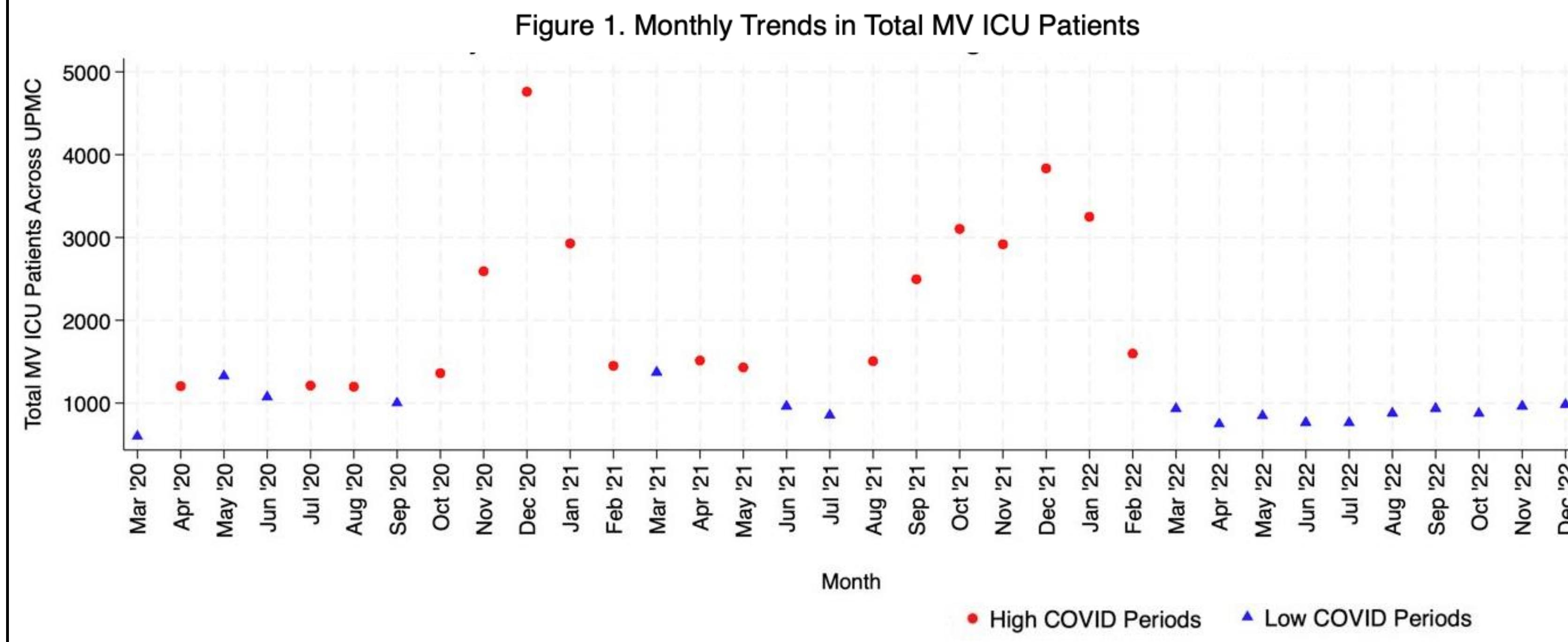
- A 13.7% **increase in ICU mortality** was observed ( $p=0.001$ , 95% CI: 1.06–1.23)
- Sedative agent charges **decreased** by 4.0% ( $p=0.031$ , 95% CI: 0.93–1.00)

Table 1. Key Baseline Characteristics

Characteristic	Low COVID-19 n = 9,687	High COVID-19 n = 10,040
<b>Age Category</b>		
18-29	385 (4.0)	389 (3.87)
30-39	608 (6.3)	607 (6.0)
40-49	852 (8.8)	803 (8.0)
50-59	1,738 (17.9)	1,807 (18.0)
60-69	2,775 (28.6)	2,820 (28.1)
70-79	2,318 (23.9)	2,460 (24.5)
80+	1,011 (10.4)	1,154 (11.5)
<b>Sex</b>		
Male	5,621 (58.0)	5,838 (58.1)
Female	4,066 (42.0)	4,202 (42.0)
<b>Race</b>		
White	8,123 (83.9)	8,361 (83.3)
Black	1,044 (10.8)	1,146 (11.4)
Asian	88 (0.9)	77 (0.8)
Other	432 (4.5)	456 (4.5)
<b>Institution</b>		
Community	607 (6.3)	662 (6.6)
Quaternary	5,445 (56.2)	5,943 (59.2)
Tertiary	3,635 (37.5)	3,435 (34.2)
<b>GOSSIS</b>		
Group 1 (<0.2)	4,540 (46.9)	4,913 (48.9)
Group 2 (0.2–<0.4)	2,072 (21.4)	2,213 (22.0)
Group 3 (0.4–<0.6)	1,259 (13.0)	1,259 (12.5)
Group 4 (≥0.6)	1,816 (18.7)	1,655 (16.5)

Note: Data are presented as N (%)

Abbreviations: GOSSIS = Global Open Source Severity of Illness Score



\*Reference group: patients aged 18-29

† Reference group: patients admitted the medical ICU (MICU)

‡ Reference group: patients admitted in 2020

§ Reference group: GOSSIS Group 1

|| Reference group: White race

## Conclusions

- Periods of High COVID-19 were associated with increased odds of ICU mortality and a reduction in sedative use**
- This highlights the impact of healthcare strain on non-COVID-19 ICU patients

### Limitations

- Single-health system may limit generalizability
- No data on sedation timing or duration
- Inability to capture admitting diagnosis
- Future studies should consider comparing ICU-level outcomes between the pre- and post-pandemic periods and evaluating sedative drug use in the context of national shortages.

### References:

- French G, et al. MMWR Morb Mortal Wkly Rep. 2021;70(46):1613-1616
- Bravata DM, et al. JAMA Netw Open. 2021;4(1):e2034266
- Barker AK, et al. Chest. 2024;166(1):118-126