



The Impact of COVID-19 Pandemic on Patient Safety Indicator-12 in a Multi-Site Health Care System

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Presenter Financial Disclosure

I do not have relevant or material financial interests that relate to the research described in this presentation.

I will not be discussing unlabeled/investigational uses of medical devices or pharmaceuticals during this presentation.

BACKGROUND

- Patient safety indicators (PSI) are hospital quality measures designed by the Agency for Healthcare Research and Quality (AHRQ) to capture potentially-preventable adverse events. PSI-12 is defined as perioperative pulmonary embolism (PE) or deep vein thrombosis (DVT).¹
- It is unclear how active COVID-19 infection, which is known to be associated with coagulopathy², has impacted PSI-12 performance.
- Therefore, we sought to compare the cumulative incidence of PSI-12 in patients hospitalized with acute COVID-19 infection compared to those without acute COVID-19 infection.

1. Agency for Healthcare Research and Quality. Patient Safety Indicators Overview. Accessed December 15, 2021. https://qualityindicators.ahrq.gov/modules/psi_resources.aspx#techspecs.

2. Aziz F, Patel M, Ortenzi G, Reed AB. Incidence of Postoperative Deep Venous Thrombosis Is Higher among Cardiac and Vascular Surgery Patients as Compared with General Surgery Patients. *Ann Vasc Surg*. 2015;29(4):661-669. <https://doi.org/10.1016/J.AVSG.2014.11.025>

METHODS

Design, Setting & Population

- Retrospective cohort
- Three Mayo Clinic medical centers in Minnesota, Arizona, and Florida from April 1, 2020 through October 4, 2021.
- Includes all PSI-12-eligible encounters
- Any patient with a COVID-19 diagnosis code or a positive COVID-19 polymerase chain reaction/antigen test during the hospitalization were considered to have acute COVID-19 infection.

METHODS

Statistical Analysis

- We compared the unadjusted rate of PSI-12 events among patients with COVID-19 infection versus patients without COVID-19 infection using Fisher's exact chi-squared test, and we compared adjusted rates of PSI-12 by adjusting for the AHRQ/WinQI expected risk of PSI-12.
- We analyzed medical records of all COVID-19 infected patients who experienced a PSI-12 and summarized results of that case-series using frequencies, means, and qualitative methods.

RESULTS



50,400 PSI-12 eligible encounters



Absence of Acute COVID-19,
N=50,143



210 with PSI-12



Acute COVID-19,
N=257



8 with PSI-12

RESULTS



Outer ring for
absence of acute
COVID-19

Inner ring for
acute COVID-19

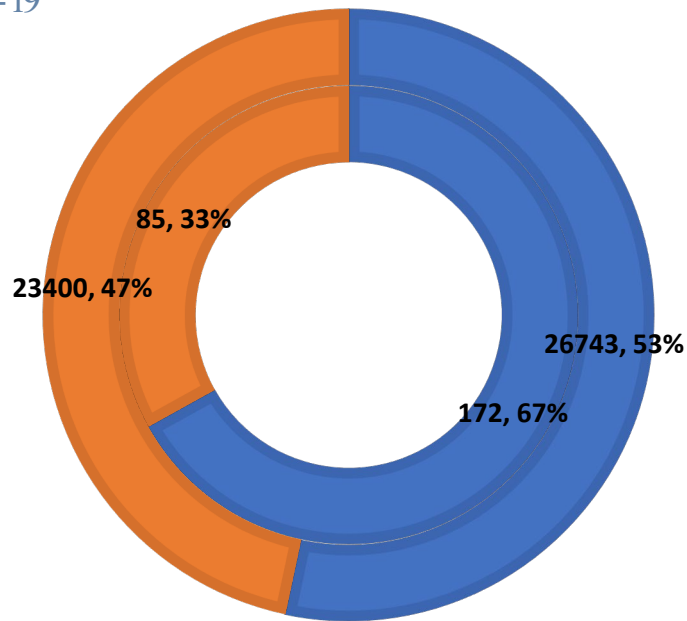


Fig 1. Sex

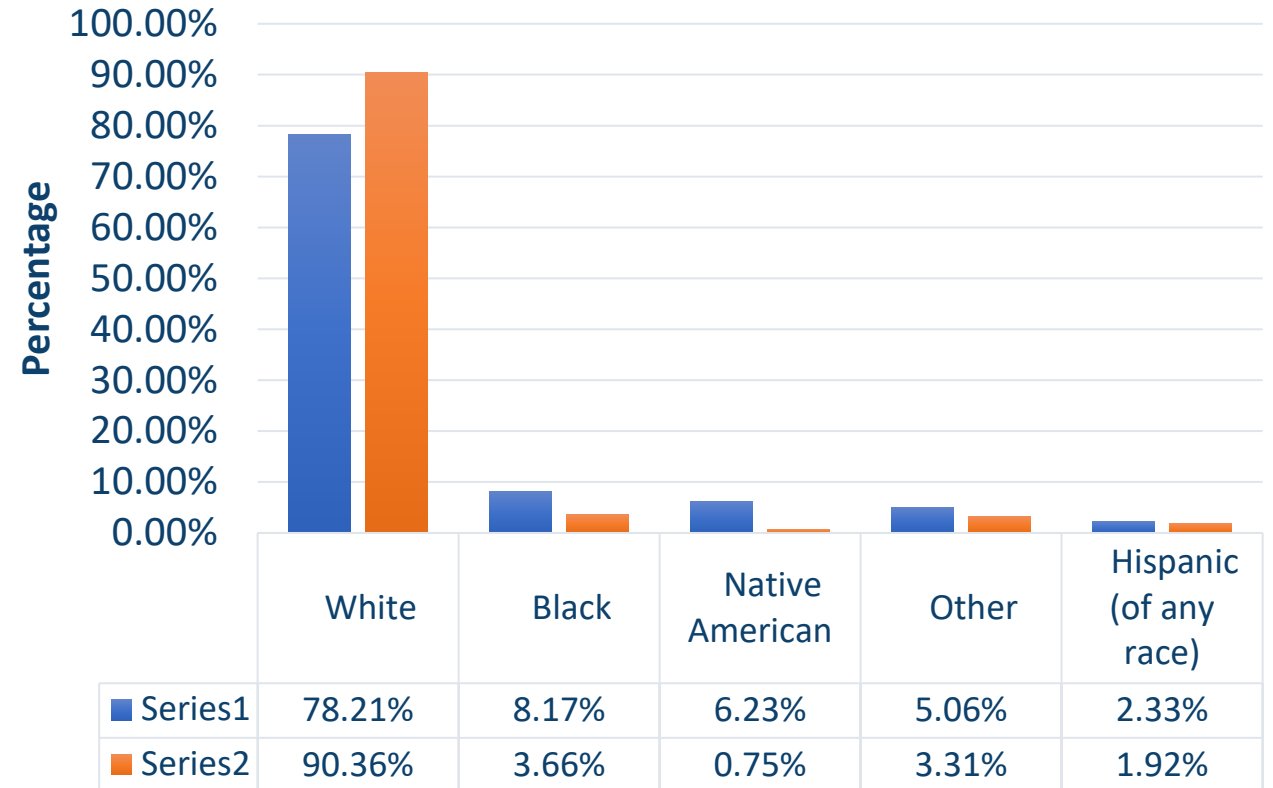
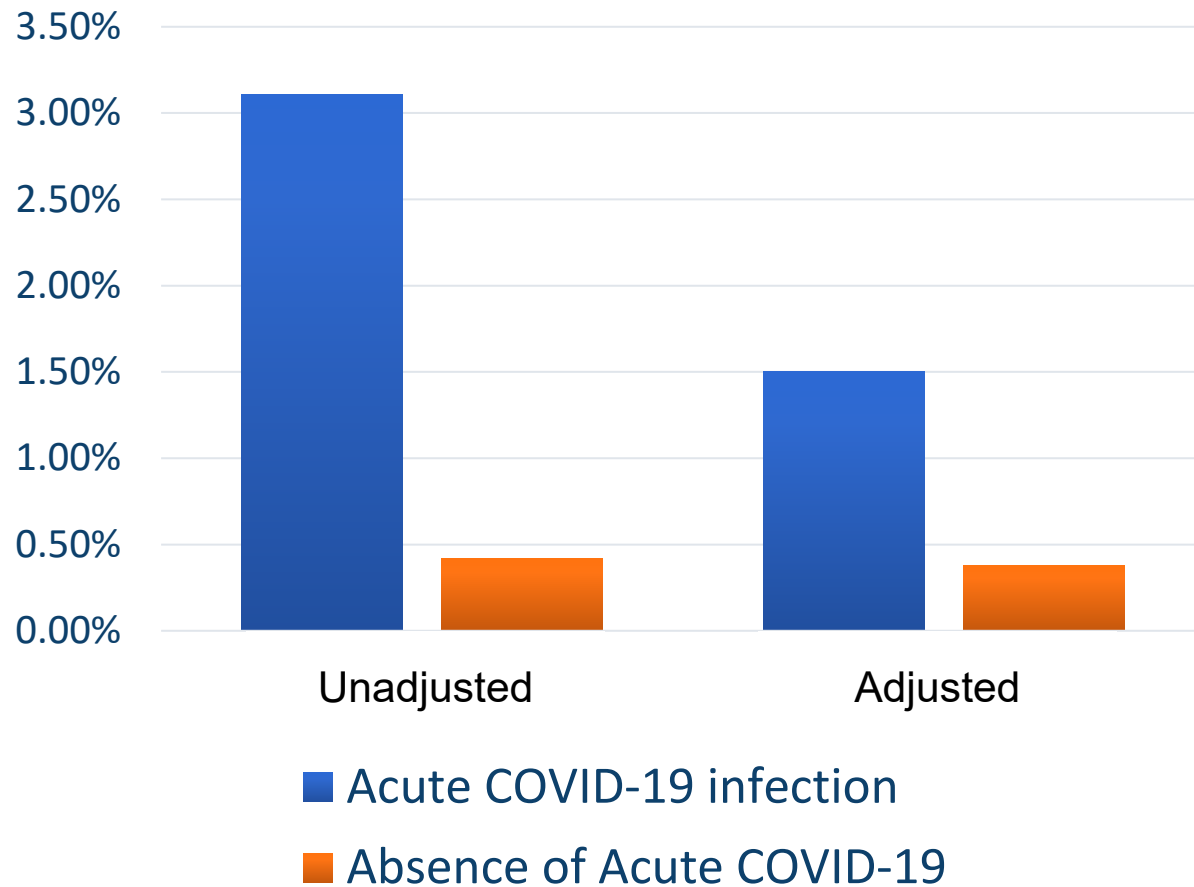


Fig 2. Race/Ethnicity

RESULTS

PSI-12 Rate



Characteristic	Acute COVID-19 (n=257, 0.51%)	Absence of Acute COVID-19 (n=50,143, 99.49%)	p- value*
Unadjusted PSI-12, n	8 / 257	210 / 50,143	<0.01
Rate, 95% CI	3.11% (1.35%, 6.04%)	0.42% (0.36%, 0.48%)	
Adjusted** PSI-12, n	8 / 257	210 / 50,143	<0.01
Rate, 95% CI	1.50% (0.81%, 2.76%)	0.38% (0.33%, 0.44%)	

*Exact chi-squared test for unadjusted, Wald chi-squared for adjusted; **For WinQI derived expected risk of PSI-12

RESULTS

Acute COVID-19 patients

- *Sex*: All were male, except for 1
- *Age*: > 50 years
- *Reason of hospitalization*: Pneumonia due to COVID-19, except for one who had altered mental status and a brain mass
- *Risk factors*: No history of VTE, but three had malignancies and two were morbidly obese

RESULTS

Acute COVID-19 patients

- Events: PE (n = 5, 62.5%), and DVT (n = 3, 37.5%)
- All required ICU care, and 4 out of 8 died during hospitalization
- *Procedures*: Tracheostomy (n = 6, 75%), craniotomy (n = 1), blowhole skin incisions (n = 1)
- *Mean days (SD) from procedure to VTE diagnosis* were 0.12 days (7.32)
- *Mean days (SD) from positive PCR to VTE diagnosis* were 12.87 days (15.94)

DISCUSSION

Our study identified a higher rate of PSI-12 events in patients with acute COVID-19 infection. Higher VTE rate and VTE-associated mortality is reported during COVID-19 hospitalization.²

These cases have highlighted several critiques to the PSI-12 metric, even before the pandemic.³ The inclusion of VTE diagnosed after a required secondary surgical procedure, VTE diagnosed prior to a procedure, and lack of risk adjustment for COVID-19 related VTE.

PSIs are currently used in several pay-for-performance programs. Risk-adjusting for medical complexity may have significant impact on payment reconciliation.⁴

1. Rali P, O'Corragain O, Oresanya L, et al. Incidence of venous thromboembolism in coronavirus disease 2019: An experience from a single large academic center. J Vasc Surg Venous Lymphat Disord. 2021;9(3):585-591.e2. <https://doi.org/10.1016/j.jvs.2020.09.006>
2. Held N, Jung B, Sommervold L, Singh S, Kreuziger LB. Patient safety indicator-12 rarely identifies problems with quality of care in perioperative venous thromboembolism. J Hosp Med. 2020;15(2):75-80. <https://doi.org/10.12788/jhm.3298>
3. Blay E Jr, Huang R, Chung JW, et al. Evaluating the Impact of the Venous Thromboembolism Outcome Measure on the PSI 90 Composite Quality Metric. Jt Comm J Qual Patient Saf. 2019;45(3):148-155. <https://doi.org/10.1016/j.jcjq.2018.08.009>

CONCLUSIONS

- Acute COVID-19 infection is associated with a four-fold increase in the risk for PSI-12, and this increase is not accounted for with current risk-adjustment.
- The present definition of PSI-12 is likely to negatively and differentially impact hospitals' publicly reported quality performance.
- We recommend continuing exclusion of acute COVID-19 from the PSI-12 denominator, or improving risk-adjustment for COVID-19, to avoid unintended consequences for tertiary and academic hospitals caring for the largest numbers of the sickest patients.

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THANK YOU