The SARS-CoV-2 pandemic subjected hospitals worldwide to unprecedented stress. Different hospitals managed stressors differently; not surprisingly, COVID-19 risk-adjusted outcomes varied widely between hospitals.1 Potential mechanisms explaining these differences in outcomes are complex but could include structural factors, such as bed and intensive care unit capacity, staffing levels, equipment availability, treatment formularies, and infection control infrastructure. Differences may also be attributable to human factors, such as hospitals’ quality and safety cultures, staff morale and well-being, facilitation and uptake of patient vaccination, and local COVID-19 management patterns. This begs the question whether hospital systems with more centralized coordination, standardization, shared sense of mission, and long histories of nurturing safer care were able to achieve better outcomes for patients with COVID-19.

The potential US exemplar in this space is the Veterans Health Administration (VHA). The VHA operates 123 acute-care hospitals nationwide and is the largest integrated health care delivery system in the country. There are many reasons why VHA hospitals may deliver better care compared with peers.2,3 These include centralized, standardized measurement of key processes and outcomes; systemwide quality and safety programs, such as deep vein thrombosis prophylaxis, fall prevention, and hospital-acquired infection prevention; a centralized pharmacy that includes robust antibiotic stewardship initiatives; a shared sense of mission; and a shared electronic health record that enables decision support, integration of care, and measurement and accountability. During the pandemic, the VHA leveraged these assets to mount a centralized COVID-19 response that included systemwide tracking of cases, access, capacity, and key quality and safety measures for COVID-19; production and dissemination of guidance for the acute management of COVID-19, staffing models, and ethical use of scarce resources; intense education, communication, and decision support for frontline clinicians; and sharing of resources, including staff, supplies, and expertise, across the system to mitigate scarcity and provide resiliency to organizational stresses during surges.

An impressive study by Ohl and colleagues4 elsewhere in JAMA Network Open attempts to answer whether COVID-19 care was better in VHA vs non-VHA hospitals by comparing 30-day mortality rates among 64,856 US veterans aged 65 years and older hospitalized with COVID-19, with 17,035 treated at 121 VHA hospitals and 47,821 treated at 4,369 community hospitals.4 The investigators found that crude mortality rates were indeed significantly higher for veterans admitted to community hospitals vs VHA hospitals (27.1% vs 17.7%; P < .001). There were important differences, however, between patients admitted to VHA vs community hospitals: patients admitted to community hospitals were older, more likely to be White, non-Hispanic, and rural residents, and more likely to have comorbid conditions, including congestive heart failure, coronary disease, chronic lung disease, obesity, stroke, cancer, and kidney disease. After adjusting for these differences using inverse probability of treatment weighting, however, mortality rates remained higher in community vs VHA hospitals (adjusted 30-day mortality odds ratio, 1.37; 95% CI, 1.21-1.55).

Ceteris paribus (“all else being equal”), these findings appear to affirm the potential strengths of VHA care. On closer look, however, all things may not be equal. First, while the investigators adjusted for an extensive list of patient demographic characteristics and comorbidities, the only indicator of severity of illness included in the analysis was procedure codes for mechanical ventilation, present on admission in 3.2% of both VHA and community hospital groups. Not only are procedure codes an unreliable way to ascertain mechanical ventilation (these codes miss many patients receiving ventilation and are used variably between hospitals),5 but mechanical ventilation alone is a very...
coarse way to measure severity of illness. It misses milder levels of respiratory dysfunction (ranging from hypoxemia alone without supplemental oxygenation through to high-flow oxygen by nasal cannula). It also misses other acute organ failures associated with COVID-19. The estimated odds for 30-day mortality changed markedly after risk adjustment, decreasing from a crude odds ratio of 1.76 (95% CI, 1.64-1.90) to 1.37 (95% CI, 1.21-1.55). One wonders whether the odds ratio might have decreased further if the investigators had been able to adjust for severity of illness using more granular markers of disease, including vital signs, supplementary oxygenation needs, and laboratory values.

Second, the investigators included patients who transferred between VHA and community hospitals in the analysis (approximately 10% of the study cohort), assigning patients to their final site of care for the purposes of analysis. However, indications for transfer from VHA hospitals to non-VHA hospitals and the reverse are different. Many VHA hospitals are smaller than their community counterparts and may have needed to transfer patients with more severe disease to non-VHA hospitals (eg, those requiring extracorporeal membrane oxygenation). Conversely, veterans initially admitted to non-VHA hospitals are typically transferred to VHA hospitals only once they are stabilized and recovering. In net, this could have lowered observed mortality in VHA hospitals and increased observed mortality in non-VHA hospitals.

Third, during the height of the pandemic, the majority of VHA hospitals tested all admissions for SARS-CoV-2. Admission testing in non-VHA hospitals, however, varied widely between institutions. Some tested all admissions, others did not.6 This allows for the possibility of ascertainment bias, where VHA hospitals were more likely to diagnose COVID-19 in patients with milder illness (and later in the pandemic, possibly even misdiagnose COVID-19 in patients with residual viral debris alone from remote prior infection). This too would lead to lower perceived COVID-19 mortality rates in VHA vs community hospitals.

Finally, the investigators did not provide supporting data to explain why outcomes differed between VHA vs community hospitals, leaving questions about which elements of health care delivery might explain better outcomes. Were there important differences in bed capacity and staffing ratios? Were there differences in adherence to best practices for general hospital care or more nimble adoption of shifting COVID-19 treatment standards for respiratory support or medication use? Were there meaningful differences in hospital safety processes or other measurable aspects of safety culture? Documenting meaningful differences in these parameters would not only support the validity of the observed mortality difference between VHA vs community hospitals but would also help identify which VHA practices should be emulated by other institutions.

All told, the investigators are to be congratulated for assembling a large data set to tackle a challenging but critical policy question. We believe there is high value in systematically comparing outcomes for patients treated in different hospitals for similar conditions. Such comparisons have the potential to illuminate meaningful differences in health care delivery that could advance care by improving accountability and identifying mechanisms of success. To make these comparisons more meaningful, however, we will need to build better data systems that include granular, standardized clinical data, such as vital signs, laboratory tests, oxygen support devices, and medications, to support more robust ceteris paribus comparisons. More informative analyses will also require adding process measures to data sets to help elucidate why risk-adjusted outcomes differ between hospitals, such as staff-to-patient ratios, measures of staff well-being and safety culture, and parameters for support services, including infection control, quality, and other programs. These comparisons are within reach, thanks to improving electronic health record standards, terminology, and computational capabilities.

The SARS-CoV-2 pandemic imposed an unprecedented stress test on hospitals that exposed striking differences in outcomes between hospitals. It now behooves us to put in place the data systems and processes that will allow us to learn as much as possible from these experiences so that we can optimize care for both routine operations now and the inevitable crises of the future.
Is COVID-19 Care Better in Veterans Health Administration Hospitals?

ARTICLE INFORMATION
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