Outcomes of COVID-19 With the Mayo Clinic Model of Care and Research

To the Editor: We read with interest the article published by our colleagues about the coronavirus disease 2019 (COVID-19) treatment outcomes at Mayo Clinic.[1] We commend them for the excellent work and for establishing that superior outcomes are possible with a care model that is multidisciplinary, collaborative, agile, compassionate, and socially responsible. The authors reported that from March 1, 2020, to July 31, 2020, the overall mortality for patients afflicted with COVID-19 managed at Mayo Clinic was 1.1%. The mortality for hospitalized patients was 7.1%, whereas the mortality for those who required intensive care unit care was 11.9%. This was lower than in most studies reported in the literature and government data.[1]

Several points bear emphasis. Although we agree that mortality rates are lower numerically, there are some aspects that we want to point out. Hospitalization and mortality rates can easily be confounded by comorbidities, race, ethnicity, and social determinants of health. The variables mentioned have important implications on COVID-19 outcomes.[2] In a study referenced, black patients represented 37.3% of the study population compared with only 9.3% in this study.[3] It is important to know the proportion of patients in this study that experienced homelessness or patients without health insurance. It is possible that the rates in this study were different from other studies because the populations were very different from each other.

Second, best practice supportive care (and dexamethasone) is vitally important for treating patients afflicted by COVID-19, given that novel therapeutics have failed to exhibit mortality benefit.[4] It was correctly pointed out that the Mayo Clinic hospitals were not affected by an overwhelming surge of hospitalizations during the study period. One key piece is the staffing ratio of doctors and allied health professionals to patients. Chronic understaffing of nurses has been reported even before the pandemic, particularly in New York, where nurses routinely take care of up to 9 patients per shift.[5] The exact numbers were not reported in this study, but we suspect that our institution may have fared better than some other institutions during the pandemic.

Third, the article highlighted the importance of a multidisciplinary physician team that contributed to these outcomes. The most important factor is the exceptional teamwork of our physicians, nurses, nursing assistants, pharmacists, phlebotomists, respiratory therapists, radiology technologists, physical therapists, emergency medical technicians, medical laboratory scientists, and other allied health staff including environmental services staff, clinical assistants, language interpreters, information technologists, and other support staff. We would like to highlight this fact, and for readers to take into account their invaluable contribution to the outcomes reported in this study.

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In reply—Outcomes of COVID-19 With the Mayo Clinic Model of Care and Research

We thank the writers for emphasizing the importance of multidisciplinary team care in the outcomes reported in our article. We cannot emphasize enough the importance of every team member in achieving these patient outcomes, particularly during this time period of unique stress on the system. The point made regarding staffing ratios is well taken; although the staffing ratios throughout the time period fluctuated, staffing shortages were managed within the Mayo Clinic system and a high ratio maintained. Furthermore, the treatment review panel allowed the

opportunity for virtual bolstering of staffing ratios, providing a team-based consultation on every patient with coronavirus seen at Mayo Clinic facilities.

With regard to insurance status, 14.2% of patients did not have government, commercial, or other insurance on file and 74.3% originated from counties designated as either medically underserved areas or having substantial medically underserved populations by the Health Resources & Services Administration. Although it is difficult to compare these to other studies as these data are not consistently available, a significant proportion of the population seen was at risk of lack of regular access to medical care.

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Brevibacterium Species: An Emerging Opportunistic Cause of Bloodstream Infections

To the Editor: *Brevibacterium* species (spp) are nonmotile, catalase-positive, obligate aerobic Gram-positive bacilli.[1] A case of *Brevibacterium fermentans* meningitis was first described in 1969 in an infant who underwent placement of a ventriculocardiac shunt.[2] Clinical reports of *Brevibacterium* spp—associated bloodstream infections and endocarditis[3,4] are increasing. Yet, the organism continues to be listed as a common commensal by the National Healthcare Safety Network database of the Centers for Disease Control and Prevention.[5]

We identified all clinical isolates of *Brevibacterium* spp grown in the microbiology laboratory at Mayo Clinic in Rochester, Minnesota, from January 1, 2014, through December 31, 2019. All cultures with polymicrobial growth and sources other than blood that were not derived intraoperatively were treated as nosterile. Appropriate statistical analyses were performed, when possible, for parametric and nonparametric data with a predefined statistical significance of $P \leq .05$.

We identified 48 isolates from 45 unique patients with a median (interquartile range [IQR]) age at diagnosis of 59 (51-72) years; 21 (47%) were women. Fourteen patients (31.1%) had an identified malignant neoplasm, and 9 (20.0%) received chemotherapy within the past 30 days (Figure A). Seven patients (15.5%) were recipients of stem cell or solid organ transplant. The median (IQR) hospital length of stay was 6 (4-17) days; the median (IQR) intensive care unit length of stay was 1.0 (0-2.5) days.

Of the 48 cultures, 30 (62.5%) had monomicrobial growth from a sterile source. Blood cultures represented 21 (70%) of these. The median (IQR) time to growth was 57 (46.25-85.50) hours. Time to positivity was weakly negatively correlated with the number of positive blood culture bottles, with a decrease of 8.9 hours for every additional bottle that tested positive (R^2=0.27) (Figure B). Six of 7 isolates (85.7%) with available antimicrobial susceptibility testing were noted to have either resistance or intermediate susceptibility to penicillin (resistance: minimum inhibitory concentration (MIC), >8 μg/mL; intermediate: MIC, 2 μg/mL) and ceftriaxone (resistance: MIC, >2 μg/mL; intermediate: MIC, 2 μg/mL). All isolates were susceptible to vancomycin (MIC, <1 μg/mL).

The median (IQR) Charlson Comorbidity Index score was 5 (2.5-8.5). The likelihood of bacteremia was increased for posttransplant status and recent chemotherapy (Figure A). The mortality rate at 30 days was high (13.0%).

The clinical importance of *Brevibacterium* spp has yet to be established. In our limited experience, stem cell or solid organ transplant recipient status and recent chemotherapy were individually associated with positive blood cultures. It is unclear whether this represents a greater number of blood samples drawn in this population. These patients had a high mortality rate that could not be correlated with other analyzed comorbidities or Charlson Comorbidity Index score. This association with bloodstream infection may be true particularly for patients with a shorter time to blood culture positivity and multiple positive blood culture bottles.

Susceptibility data suggest that intravenous vancomycin offers a reasonable empirical treatment option. *Brevibacterium* spp should be considered an opportunistic cause of bacteremia and cardiovascular infection in immunosuppressed hosts without an alternative explanation. Additional studies need to be undertaken to further define host populations in whom this organism presents pathogenicity.