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Jeffrey Silberzweig

J. Ganesh Bhat

Mary O. Dittrich

Raghu Durvasula

Jeff Giullian

See next page for additional authors

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Authors

Jeffrey Silberzweig, J. Ganesh Bhat, Mary O. Dittrich, Raghu Durvasula, Jeff Giullian, Jeffrey L. Hymes, Doug Johnson, Brigitte Schiller, Richard Spech, Leslie Spry, Geoffrey Scott Walker, Suzanne Watnick, Jerry Yee, and Barry I. Freedman

Collaboration between Dialysis Providers

Jeffrey Silberzweig ^{1,2} J. Ganesh Bhat ^{3,4} Mary O. Dittrich ⁵ Raghu Durvasula,⁶ Jeff Giullian,⁷ Jeffrey L. Hymes,⁸ Doug Johnson,⁹ Brigitte Schiller,^{10,11} Richard Spech,¹² Leslie Spry,¹³ Geoffrey Scott Walker,¹⁴ Suzanne Watnick,^{15,16} Jerry Yee,^{17,18} and Barry I. Freedman ^{19,20}

Due to the number of contributing authors, the affiliations are listed at the end of this article.

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THE CORONAVIRUS DISEASE 2019 PANDEMIC AND ESKD

The first reported death in the United States from COVID-19 on February 29, 2020 was a patient receiving maintenance dialysis. Since then, COVID-19 has affected all patients receiving maintenance dialysis in this country, by direct illness or changes to the system.¹ Patients with ESKD have four-fold higher exposure to SARS-CoV-2 than the general population² and 3-4X more infections, but severe illness, defined by need for hospitalization, is up to 10X higher and mortality from COVID-19 is 20%–30% higher. Mortality rates in patients with ESKD in the US rose by 15%–20% in 2020³ compared with similar periods in 2017 through 2019. Mortality from COVID-19 was also high in patients with functioning kidney transplants (16% of deaths in 2020), a 20% increase in mortality from 2018 and 2019.⁴

SHARING: INFORMATION, SUPPLIES, AND CAMARADERIE

On March 4, 2020, ASN invited chief medical officers (CMOs) to a conference call. Fourteen dialysis organizations, caring for >97% of patients with ESKD in the US, joined the call. After outlining the status of COVID-19, discussions centered on emerging data from other countries suggesting an impending pandemic and steps providers might take to reduce its effect on their patients and staff. Medical officers from the CDC shared the latest available information.

CMOs recognized the need to bolster infection prevention protocols⁵ and a shared common purpose: to advance patient-centered care. CMOs understood the need to support the pandemic response and care for patients in their medical homes reducing the burden on hospital systems. CMOs universally agreed that our vulnerable population would be best served by continued collaboration.

Initial hesitation about revealing proprietary information quickly ended and unpublished data were shared openly. Early in the pandemic, critical shortages of personal protective equipment (PPE) created concerns about the feasibility of universal masking in dialysis facilities. CDC and state surveyors questioned its necessity, but unpublished data indicated benefits.⁶ The leaders of dialysis organizations shared resources to help all patients receive care in the safest possible environment. The burgeoning pandemic required development of practices to meet its challenges. Before the pandemic, patients often ate during dialysis; the pandemic limited this practice.

COLLABORATION AND INFORMATION SHARING SAVES LIVES

Proactive screening of patients and staff entering the dialysis facility reduced exposure to SARS-CoV-2. Our collaboration led to the Dialysis Community Response Network, facilities treating patients with COVID-19 regardless of their home unit or organization. Care in these facilities

was limited by inability to transport patients across geographic boundaries and insufficient capacity so existing facilities dedicated sections for patients with known or suspected infections, or aggregated patients during the last treatment shift of the day to facilitate terminal cleaning.

Early discussions documented the benefits of home dialysis for reducing exposure. Expansion of home programs was limited by inadequate numbers of staff to train patients. Precise analysis of the effect of the pandemic on home dialysis was confounded by the mandatory ESRD Treatment Choices model implemented during the pandemic. To limit exposure, some considered shortened dialysis treatments or altered treatment regimens; however, this was not recommended or performed on a large scale.

Controversies addressed by the group included which clinical scenarios caused aerosolization and required use of N-95 masks, goggles, and face shields as opposed to standard masks. Initially, information from federal and state agencies was disparate. By sharing internal information, emerging data and expert opinion, the CMOs found common ground and a unified response to surveyors. Elective

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Correspondence: Dr. Jeffrey Silberzweig, The Rogosin Institute, 505 E. 70th St., New York, NY 10021. Email: jis2003@nyp.org

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procedures were deferred across the country early in the pandemic; CMOs collaborated to encourage CMS to define vascular access procedures as nonelective.

Complex issues included management of staff, who were limited from socializing with colleagues and traveling despite the risks they undertook in caring for patients with known and unknown exposure risks. Guidance from the CDC and other authorities required staff traveling to regions with high rates of SARS-CoV-2 transmission to isolate before returning to work, resulting in less time with family. Recognizing their extraordinary importance to the pandemic response, CMOs shared ideas and practices for supporting and encouraging staff.

Patient-related issues remained central to discussions. Some patients required dialysis immediately after travel; sharing protocols for managing these situations helped reduce risk. Patients residing in group settings required increased attention. Some patients were unable to wear masks during treatment due to comorbid medical conditions, whereas others simply refused. Sharing approaches to managing these patients optimized care.

Working together, the CMOs voiced the need for prevention and treatment of COVID-19 in patients with ESKD. Many therapeutic trials excluded patients with advanced kidney disease; through sharing protocols and outcomes, the dialysis community rapidly gained confidence in their safety and efficacy, allowing provision of these medications in dialysis facilities.

Once vaccines became available, patients with CKD were in priority group 1c of the ACIP guidelines.⁷ Recognizing the risks to patients with ESKD, especially those anticipating transplants, CMOs expressed urgency about vaccinating patients in their dialysis facilities. Several states and localities provided vaccines to dialysis providers; most patients were not so fortunate. The CMOs shared information regarding timing of vaccine

administration, vaccine safety and efficacy and management of vaccine hesitancy, facilitating vaccination of nearly 75% of our patients. Dialysis providers, the CDC, and ASN developed the framework of a network administrator model for vaccine distribution to dialysis centers across all 50 states, territories, and tribal nations in rural and urban settings.

The CMOs and the nonphysician leadership of their organizations addressed our concerns with the CDC, congressional representatives, governors, and The White House. In response to this persistent advocacy, The White House announced an allocation of vaccines to dialysis providers on March 31, 2021; DaVita and Fresenius served as distribution hubs for other providers. Once vaccines became widely available, some providers mandated employee vaccination. Others hesitated due to worsening shortages in the health care workforce. Open sharing of the response to mandates allowed organizations to optimize their respective staff safety protocols.

Our pooled data from 487,787 patients with ESKD shows an increase in the proportion of patients completing a primary series of an approved vaccine against COVID-19. Notably, the increases were greater for patients from minority populations, narrowing initial disparities (Table 1).

SHARING PROTOCOLS TO SAFEGUARD EVERYONE

Following CDC's advice, providers adapted enhanced cleaning and disinfection protocols, increased separation of dialysis stations, chairs in waiting areas,

and staff breaks; and asked patients to wait outside facilities.

The CDC initially had insufficient information to provide guidance on cohorting patients with active COVID-19, managing exposed patients who felt well, and duration of isolation after clinical recovery. Prepublication data from CMOs that patients with ESKD had prolonged positive SARS-CoV-2 RT-PCR tests compared with fully immunocompetent patients. Providers and the CDC questioned whether such tests represented risk of transmission. By sharing data, patterns emerged allowing CMOs to conclude that patients who were clinically well could return to the general treatment population 10–14 days after symptom resolution, despite positive RT-PCR.⁸

Rapid adoption of waivers from HHS allowed telemedicine visits, which reduced the number of providers in the dialysis facilities, permitted communication with patients dialyzing at home, and reduced crowding at hemodialysis centers. Other topics discussed included permitting visitors in treatment areas and accepting transient patients from other dialysis facilities. These common practices ended in most facilities at the onset of the pandemic. For patients requiring assistance during dialysis treatments shared protocols facilitated the safe inclusion of visitors.⁹

Hot spots early in the pandemic faced supply shortages of solutions for acute dialysis treatments. Approaches to management of AKI including reducing dialysate flow rates, novel approaches to CKRT, onsite manufacturing of fluids, and treatment of AKI by PD allowed all patients to receive necessary life-saving care.

Table 1. Vaccination status by race and ethnicity

Race and Ethnicity	Vaccinated by March 29, 2021 (%)	Vaccinated by April 30, 2021 (%)	Vaccinated by December 31, 2021 (%)
Overall	52	67	72
Non-Hispanic Black	48	66	71
Non-Hispanic White	57	71	74
Non-Hispanic Asian	63	79	82
Hispanic	54	74	77

Providers shared preliminary data from their programs and created libraries of published manuscripts from around the world. By sharing preliminary data, CMOs created guidance and could assess the response of patients with ESKD to SARS-CoV-2 vaccination.¹⁰ Providers received guidance on the basis of data before it was available in the United States. Critically important data from this collaboration assessed the response of patients with ESKD to SARS-CoV-2 vaccination.¹⁰ Early data suggested antibody responses to vaccination were less vigorous and took longer to develop in patients with ESKD. In addition, antibody production waned more quickly. Response to the mRNA vaccines appeared to be more potent relative to the adenovirus vector vaccine. Consensus among the CMOs and discussion with the CDC led to the conclusion that third doses are appropriate for many patients with ESKD, particularly those who are immunocompromised and those active on transplant waiting lists.

ADDRESSING CONFUSING GUIDANCE

Dialysis providers received guidance from federal agencies (CDC, Occupational Safety and Health Administration [OSHA]), state, and local departments of health. By sharing interpretations, providers were better able to manage their responses. The lack of uniform guidance created confusion for patients who were, at times, uncertain of how to respond to advice from their physicians.

Late in 2021, OSHA issued guidance for providers treating patients infected with SARS-CoV-2 regarding required PPE, management of exposed staff, and ventilation of facilities. Some of this guidance was already common practice. Other aspects created additional burden which was eased by shared approaches. Vaccination mandates for health care workers, stayed in some locations; threaten to reduce staffing in

facilities already struggling to find sufficient staff.

ADDRESSING MULTIPLE SIMULTANEOUS CRISES

Exhausted patients and staff turned to their CMOs for support and reassurance. Our collaboration allowed CMOs to support and learn from each other. Sharing data and approaches to problems created a sense that no one was facing this crisis alone. In turn, CMOs reassured staff that treatments, approaches, and vaccines were emerging and that they were receiving guidance from national experts to guide them through the pandemic.

When an ice storm hit Texas and Tennessee in February 2021, CMOs

Health care workers stepped up risking their own health and that of their families to care for their patients

collaborated to ensure that water and generators delivered to the affected areas allowed all patients to receive dialysis even at facilities other than their home unit.

ONGOING CHALLENGES

When the omicron variant led to a surge in COVID-19 cases, vaccinated patients had milder cases. Dialysis facilities reinvigorated vaccination and infection prevention protocols to reduce the risks.

RECOGNIZING THE TRUE HEROES

Health care workers stepped up risking their own health and that of their families to care for their patients.

Patients also responded to the crises, accepting shifts in their schedules, facilities, caregivers, and treatment times without complaint.

Most patients arrive at dialysis centers via ride-share services run by mass transit companies. Transit workers risked exposure to serious illness and are another group of unsung heroes.

CONCLUSION AND FUTURE STEPS

The COVID-19 pandemic created an opportunity for CMOs of dialysis providers to come together to share information, data, and camaraderie in a transparent environment. Each emerged stronger and the entire industry benefited. Patients with ESKD gained from the collective experience, expertise, and knowledge.

It is not clear what challenges lie ahead. However, the CMOs remain committed to long-term collaboration,

sharing of clinical data in real time and improving the work environment of the dedicated professionals and patients served in dialysis facilities across the country. The regular calls continue supplemented by an in-person annual meeting once the pandemic is controlled.

The ability to maintain the health of patients with ESKD requires early involvement of nephrologists in disaster planning by hospitals and governments, open data sharing, discussion of regulations and protocols among providers and with governing agencies, and ongoing discussions to ensure that guidance from the agencies has no unintended consequences for the provision of safe care.

DISCLOSURES

J.G. Bhat reports being employed by Atlantic Dialysis Management Services, LLC. M.O. Ditch reports having ownership interest in Signify Health, US Renal Care, and multiple dialysis units. B.I. Freedman reports serving on the

editorial boards of *American Journal of Nephrology*, *JASN*, and *Kidney International*; having consultancy agreements with, and receiving research funding from, AstraZeneca Pharmaceuticals and Renalytix AI; serving as CMO of Health Systems Management, Inc.; and having patents and inventions with Wake Forest University Health Sciences, and to a US patent related to APOL1 genetic testing. J. Giullian reports being employed by, and having ownership interest in, DaVita, Inc.; and serving as a scientific advisor for, or member of, *Nephrology News and Insights* (on the editorial board) and Nephrosant, Inc. (on the board of directors). J.L. Hymes reports having ownership interest in DaVita, Fresenius Medical Care, and Nephroceuticals; being employed by Fresenius Medical Care North America; and having other interests in/relationships with Kidney Care Partners. D. Johnson reports serving in an advisory or leadership role for Alive Hospice and American Association of Kidney Patients; and being employed by Dialysis Clinic, Inc. B. Schiller reports serving on a speakers bureau for AstraZeneca; having consultancy agreements with Quanta; being employed by Satellite Healthcare; and serving on the board of directors for Unicycive. J. Silberzweig reports having consultancy agreements with Alkahest Biotech, Bayer Pharmaceuticals, and Kaneka Pharma; and serving as a scientific advisor or member of the ASN's COVID-19 Response Team, Emergency Partnership Initiative. R. Spech reports having other interests in/relationships with Center for Dialysis Care and Nephrology Associates of Cleveland; having ownership interest in Microsoft, Moderna, and Nutrien; and being employed by Nephrology and Hypertension Associates, Inc. L. Spry reports receiving research funding from Baxter International and Outset, as primary investigator for Nebraska Nephrology Research; having other interests in/relationships with Bryan Health Connect (on the board of directors for this physician-hospital organization in Lincoln, NE) and Dialysis Center of Lincoln (as CMO for this nonprofit dialysis provider); having consultancy agreements with Guidepoint Network for Nephrology; having ownership interest in Home Dialysis of Lincoln (a for-profit home dialysis provider in Lincoln, NE); being employed by Lincoln Nephrology & Hypertension; and receiving honoraria from the Southeast Nebraska Rural Physician Association related to a presentation on Kidney Disease in September 2021. G.S. Walker reports having consultancy agreements with, receiving honoraria from, and serving as a scientific advisor or member of American Renal Associates; and being employed by Dallas Nephrology Associates. S. Watnick reports receiving honoraria from ASN (Board Review Course and Update); serving on the ASN Quality

Committee and on the editorial board for *CJASN*; having ownership interest in Cricket Health; and serving as CMO of Northwest Kidney Centers (a not-for-profit organization). J. Yee reports receiving honoraria from AlphaSights, Ardelyx, AstraZeneca, Bayer, Cara Therapeutics, Fresenius Medical Corporation North America, and Gerson Lehman Group; having other interests in/relationships with *American Journal of Nephrology* (on the editorial board), *BMC Nephrology* (on the editorial board), EBSCO/DynaMed (on the editorial board), Elsevier (as ClinicalKey author), Elsevier (as section editor), Ferri's Clinical Advisor 2022, *Journal of Onco-Nephrology* (on the editorial board), and Springer's *Heart Failure Reviews* (on the editorial board); having consultancy agreements with Ardelyx, AstraZeneca, Bayer, EBSCO/DynaMed, and Gerson Lehman Group; being employed by Henry Ford Health System; and having ownership interest in, and patents and inventions involving, Vasc-Alert. The remaining author has nothing to disclose.

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AUTHOR CONTRIBUTIONS

J.G. Bhat, B.I. Freedman, J.L. Hymes, and B. Schiller were responsible for resources; M.O. Dittrich, R. Durvasula, B.I. Freedman, J. Giullian, J.L. Hymes, D. Johnson, B. Schiller, J. Silberzweig, R. Spech, and G.S. Walker were responsible for data curation; B.I. Freedman was responsible for visualization; B.I. Freedman, J.L. Hymes, J. Silberzweig, S. Watnick, and J. Yee conceptualized the study; B.I. Freedman and J. Silberzweig were responsible for project administration; B.I.

Freedman, J. Silberzweig, and S. Watnick wrote the original draft; J. Giullian, J.L. Hymes, B. Schiller, and G.S. Walker were responsible for validation; and all authors reviewed and edited the manuscript.

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AFFILIATIONS

- ¹The Rogosin Institute, New York, New York
- ²Department of Medicine, Weill Cornell Medical College, New York, New York
- ³Atlantic Dialysis Management Services, New York, New York
- ⁴Xavier University School of Medicine, Oranjestad, Aruba
- ⁵US Renal Care, Plano, Texas
- ⁶Puget Sound Kidney Centers, Everett, Washington
- ⁷DaVita, Inc., Denver, Colorado
- ⁸Fresenius Kidney Care, Waltham, Massachusetts
- ⁹Dialysis Clinic, Inc., Nashville, Tennessee
- ¹⁰Satellite Healthcare, San Jose, California
- ¹¹Division of Nephrology, Stanford University, Palo Alto, California
- ¹²Centers for Dialysis Care, Cleveland, Ohio
- ¹³Dialysis Centers of Lincoln, Lincoln, Nebraska
- ¹⁴Medical Advisory Committee, American Renal Associates, Beverly, Massachusetts
- ¹⁵Northwest Kidney Centers, Seattle, Washington
- ¹⁶University of Washington, Seattle, Washington
- ¹⁷Division of Nephrology and Hypertension, Henry Ford Hospital, Detroit, Michigan
- ¹⁸Greenfield Health Systems, Detroit, Michigan
- ¹⁹Health Systems Management, Inc., Tifton, Georgia
- ²⁰Internal Medicine/Nephrology, Wake Forest School of Medicine, Winston-Salem, North Carolina