Scarce Resources Roundtable Report

This is a summary report of the ASN Scarce Resources Roundtable which was held on July 28 and July 30, 2020

Darlene Rodgers, BSN, RN, CNN, CPHQ
Nurse Clinical Consultant for Excellence in Patient Care, ASN

Glenda Harbert, RN, CNN, CPHQ
Nurse Consultant, ASN

Anitha Vijayan MD, Professor of Medicine, Division of Nephrology
Washington University in St. Louis
Chair, ASN COVID-19 Acute Kidney Care Subcommittee

September 8, 2020
Table of Contents

Table of Contents ............................................................................................................................ 1
Executive Summary .......................................................................................................................... 2
Background ....................................................................................................................................... 4
Hospital Dialysis Surge: Emergency Planning, Situational Awareness, and Reporting Protocols .......... 4
  Discussion Highlights ..................................................................................................................... 4
  Lessons Learned ........................................................................................................................... 5
  Best Practice Recommendations ................................................................................................. 5
Staffing Shortage Challenges: Potential Surge Options and Training Needs ..................................... 5
  Discussion Highlights ..................................................................................................................... 5
  Lessons Learned ........................................................................................................................... 6
  Best Practice Recommendations ................................................................................................. 7
Regional and Facility-Based CRRT and Dialysis Supply Shortages: Monitoring and Reporting .......... 7
  Discussion Highlights ..................................................................................................................... 7
  Lessons Learned ........................................................................................................................... 7
  Best Practice Recommendations ................................................................................................. 8
Hospital Dialysis Innovation and Surge Strategies ........................................................................... 8
  Discussion Highlights ..................................................................................................................... 8
  Lessons Learned ........................................................................................................................... 10
  Best Practice Recommendations ................................................................................................. 11
Appendix A: ASN and HHS Scarce Resource Roundtable List of Attendees ..................................... 13
Appendix B: Shared Resources from the ASN-HHS Roundtable ..................................................... 14
Appendix C: ASN and HHS Scarce Resource Roundtable Agenda .................................................. 15
Executive Summary

The American Society of Nephrology (ASN) in partnership with the U.S. Department of Health and Human Services (HHS) Office of the Assistant Secretary for Preparedness and Response (HHS/ASPR), Centers for Disease Control and Prevention (CDC), Centers for Medicare & Medicaid Services (CMS), U.S. Food and Drug Administration (FDA), and the Department of Defense (DoD), hosted two 90-minute sessions with clinicians who were practicing in the acute in-hospital nephrology setting and experiencing surge in geographic areas experiencing COVID-19 outbreaks and hotspots (see Appendix A). The two roundtable sessions explored challenges, lessons learned, and sought to identify recommended best practices that could be helpful to other acute in-hospital nephrology settings experiencing acute and or prolonged surge from COVID-19 outbreaks and other potential pandemics in rural to urban geographic areas. The roundtables included facilitated discussions that explored five specific topics that are listed below in addition to targeted questions that are captured in the agenda enclosed in Appendix C.

- Hospital dialysis surge: emergency planning, situational awareness, and reporting protocols
- Staffing Shortage challenges and potential surge options and training needs;
- Regional and facility-based Continuous Renal Replacement Therapy and dialysis supply shortages and monitoring Hospital dialysis surge strategies and innovation

Numerous treatment and logistical areas were explored, lessons learned were discussed, and participants shared recommendations for the future as facilities continue to care for patients through this and future pandemics. One participant summed up the importance of the experience by quoting Michael Leavitt, former HHS Secretary, “Everything we do before a pandemic will seem alarmist. Everything we do after will seem inadequate.”

The following list provides an overview of key observations and recommendations that are further explored in this report:

Hospital and System Level Considerations
- A comprehensive emergency command program is critical; all hospitals should have a plan that is specific to renal replacement therapy (RRT) components and

---

integrated into the hospitals overarching emergency plan in advance of an emergency.

- Communication with local and regional partners and colleagues is critical to maintaining situational awareness of rapidly evolving surge scenarios, shortages and clinical best practices and lessons learned.
- Current regulation allows payment for patients with acute kidney injury (AKI) requiring dialysis treatment to receive those treatments in an in-center hemodialysis facility. Payment cannot be provided for home dialysis, such as continuous peritoneal dialysis (PD). Therefore, patients who are treated with PD for AKI and then discharged from hospital must be converted to hemodialysis to receive payment for this treatment.
- It is critical to address supply chain issues and manage stockpiles or just-in-time supplies where they are needed, including ventilators, Continuous Renal Replacement Therapy and intermittent hemodialysis machines, and other supplies such as tubing, bicarbonate based fluids, telemetry, O2 probes, and a stable water supply for any surge in AKI.
- Multi-discipline teams met frequently and provided each individual member with specific assignments that was critical to predicting and managing demands, including but not limited to CRRT needs, facility requirements (e.g. plumbing, biomedical engineers, etc.), burn rates of supplies, staffing needs and coordination, and other logistics.

Personnel Issues

- Nursing requirements were significant, more than anyone realized, and there is limited time and capacity to cross-train creatively.

Management of Scarce Resources

- Shortages of RRT equipment and fluid was significant. A scarce resource plan is needed in advance is should include considerations for conservation to crisis care transitions and a tracking system is critical.
- Severe bicarbonate-based CRRT and dialysate fluid shortages led to in-hospital nephrology settings developing protocols to generate dialysate fluids on site. Nephrologists at Cleveland Clinic, John Hopkins, and Columbia sought to address acute shortages through machine generated fluid protocols that they implemented and offered to share their experience and protocols.

Patient-Specific Considerations

- Hypercoagulability is a major issue in patients with COVID-19. The use of citrate for anticoagulation, while attractive, has many moving parts and if professionals are inexperienced, use and introduction in a crisis can be daunting. Additional study is needed to determine the best approach to anticoagulation in COVID-19.
- Prevention of dialysis circuit clotting requires a well-functioning vascular access with adequate flow and one academic organization developed a resource that captured best practices on approaches based on specific patient parameters.
- Several centers have experience with other synthetic direct thrombin inhibitors and that experience could assist in future anticoagulation plans.
- Peritoneal dialysis (PD) is a viable therapy option for those not in prone positions. Outpatient home dialysis nurses can be extremely helpful in training in-patient staff and others to do exchanges.
- Bedside PD catheter insertion has been performed successfully and some nephrology teams sought out surge support from interventional radiologists and surgeons that were available due to reduction in elective procedures.

**Background**

As the COVID-19 pandemic spread across the United States, the healthcare system quickly became overwhelmed. The effect of a COVID-19 infection on the kidneys and the number of patients who developed acute kidney injury (AKI) was not expected at the rate experienced. Acute and chronic dialysis facilities across the country were pressed to activate their emergency management plans and as the need for acute dialysis continued to escalate, hospitals needed to modify their procedures in real time, utilizing the best strategies known at the moment. This need to quickly scale up care was exacerbated by nationwide shortages of continuous renal replacement therapy (CRRT) and intermittent dialysis machines and bicarbonate based CRRT fluids. The attendees also indicated that shortages of PPE continued in some parts of the country.

At the request of HHS, ASN convened two 90-minute sharing sessions via teleconference to discuss the experiences and observations of professionals from across the country as they experienced unprecedented scenarios of surge and their efforts to treat COVID-19 positives patients who were experiencing severe complications. During these sessions, numerous treatment and logistical areas were explored, lessons learned were discussed, and the participants shared recommendations for the future as facilities continue to care for patients through the pandemic.

**Hospital Dialysis Surge: Emergency Planning, Situational Awareness, and Reporting Protocols**

*Discussion Highlights*

- A clear leadership chain and strong incident command structure that includes defined roles and frequent, efficient and effective communication requirements for addressing issues is critical.
- The volume of AKI and RRT experienced across geographic regions was unexpected.
- The number of coagulation issues was not expected and initially increased the amount of supplies required.
- Shortages of supplies can happen quickly in a response to the unprecedented surge scenarios.
• Although a surge plan existed in most sites, no one expected the volume and intensity of care required and the sites were quickly overwhelmed and plans needed to be flexibility to address the current situation.

**Lessons Learned**

• Knowledge gaps existed regarding the supplies available versus what was needed.
• The amount of time spent and the challenges of communicating with facility leadership and with different teams within the organization as well as learning how to identify and contact those in the hospital who could assist/approve getting supplies and hiring more staff was unexpected and consuming.
• Surge plans need to be tested in advance and easily and rapidly modifiable in real time for COVID-19.
• It would have been useful to identify and promulgate an anticoagulation strategy earlier among programs experience surge from the outbreaks.
• The option of ramping up and having an infrastructure to do acute PD would have been beneficial.
• With the expansion of multiple ICUs within a hospital, the need to standardize treatments and a protocol to staff, coordinate and monitor them is essential.
• Switching treatment methods (i.e. moving to citrate anticoagulation) is difficult, if not impossible, to do during the height of a surge and clinical staffing with variations in nephrology expertise. Non-commercially prepared dialysate does not allow for citrate anticoagulation.

**Best Practice Recommendations**

• Establish and test a coordinated leadership command structure in advance.
• Ensure the surge plan is easily modifiable and scalable across the organization.
• Establish a team and system by which to track supplies and equipment with a protocol to maximize their use.
• Conduct, at a minimum, daily calls/meetings with leadership to discuss the number of treatments, facility requirements (e.g. plumbing, biomedical engineers, etc.), staff availability, burn rates of supplies and coordination of efforts.
• Develop an anticoagulation protocol for all treatment modalities, ensure supply availability, and educate staff in advance of a surge situation.
• Understanding inventory of both machines and supplies and plan for contingencies to scale to address surge situations.
• Coordinate regional or geography based (e.g. city-wide) sharing of supplies and staffing to maximize resources.

**Staffing Shortage Challenges: Potential Surge Options and Training Needs**

**Discussion Highlights**

• Staffing shortages began early in the pandemic and continue to be an issue.
• The need for RRT and staff to perform care increased significantly. This upsurge in care needs was frequently accompanied by staff shortages due to exposure, vulnerabilities, fear and other factors. The impact of staff being PUI or COVID-19-positive on provision of treatments is substantial.

• Staff were reluctant to remain in COVID-19-positive rooms for long periods, which resulted in shorter than normal dialysis sessions.

• Some staff were exempt from treating COVID-19-positive patients due to the following:
  o Staff considered PUI or who tested COVID-19 positive
  o Staff with certain underlying conditions that were recognized as exempt from treating COVID-19-positive patients
  o Staff who failed fit testing for an N-95 mask
  o Some requested exemptions due to underlying health conditions that were not recognized as being part of a vulnerable population

• Nurses were mobilized from various areas
  o Furloughed areas of the hospital (elective surgery, invasive procedures)
  o Recently retired
  o Other parts of the organization’s network
  o Contract traveling nurses
  o Volunteers from other parts of the country

• Cross-trained staff
  o Residents and fellows, nephrology and other specialties
  o Perfusionists
  o Outpatient dialysis staff that were augmenting ICUs practiced a “buddy system” where the outpatient staff were able to prepare and monitor machines, and perform cannulation
  o Practiced team nursing/buddy system with other hospital nursing staff, pairing experienced dialysis staff with staff not familiar with the dialysis process

Lessons Learned

• Various staff could be cross-trained including those in critical care, surgery, intensivists, and others.

• Having a predefined written plan on how to surge up nursing staff is critical.

• Opening designated COVID-19 outpatient dialysis facilities helps to keep stable COVID-19-positive patients out of the hospital and relieves some of the acute setting challenges.

• Prepare for increased hours and overtime, increased cost and staff fatigue.

• Donning and doffing of PPE procedures needs to be reviewed and staff understanding of the current PPE requirements ensured adaptation to changing recommendations.

• The use of acute PD was helpful in some settings; ICU nurses are able to perform acute PD which frees up the acute dialysis staff to perform other modalities.

• Learning new technology during an emergency situation is not recommended; staff need to be prepared prior to the surge.
**Best Practice Recommendations**

- Develop a staffing surge plan detailing all staffing options and education required for “flexed” staff.
- National and inter-state licensure clarity is necessary.
- Examine cross-training between in-center and hospitals now.
- Increase cross-training, specifically in sustained low efficiency dialysis (SLED) and prolonged intermittent renal replacement therapy (PIRRT).
- Employ preemptive cross-training for current and potential surge staff on different machines and new technology that may be available during a surge.
- An unknown volume of nurses has retired or left the field during the pandemic, thus, it is important to constantly evaluate staff availability.
- Establish a “buddy system” that can maximize surge capacity for both outpatient dialysis clinical staffing for preparing patients and non-specialized clinical staffing that may provide surge support and can potentially monitor and support patients while on treatment in the ICU setting.

**Regional and Facility-Based CRRT and Dialysis Supply Shortages: Monitoring and Reporting**

**Discussion Highlights**

- A protocol was needed to facilitate the sharing of machines and to avoid aligning nursing turnover with devices turnover; there were logistical challenges in pairing patients and knowing where a machine was going next.
- A CRRT huddle was conducted daily with the patient care staff.
- Dialysis supplies are part of the hospital inventory and supply system.
- Early on there was concern was about running out of machines; however, in hitting the surge, hospitals realized the importance of understanding and management of disposables and the supply chain, and communicating with those in charge of central resources.
- Very high disposable burn rates/usage were experienced initially before anticoagulation and monitoring was established and reminders were sent to nephrologists to be mindful of supply limitations.
- Additional machines were rented but this did not come with an increased supply quota, so facilities were unable to order additional supplies to use with added machines and had to negotiate this increase; also, with additional machines comes the need for additional staff.
- Various methods were employed to reserve RRT fluid, including, but not limited to, and depending on the stability of the patient:
  - Decreasing time on the machine
  - Decreasing flow rates
  - Changing modalities, including the use of acute PD and moving from CRRT to PIRRT
• The opportunity to weigh in on scarce resources with an ethicist should be considered for decisions regarding RRT, ECMO, ventilators, etc. Decisions would include survival likelihood.
• Besides the increased demand due to COVID-19, many of the non-COVID-19 related procedures (access surgery for example) are being postponed adding increased stress to the system.

Lessons Learned
• The Cleveland Clinic protocol for producing in-house dialysis solution was reviewed, and their team was consulted. The protocol was further modified by the University of Michigan, Columbia and others based on testing and lessons learned. The protocols were also modified in accordance with FDA recommendations. The protocols included considerations for monitoring, endotoxin testing, and quality control and ensured use within 24 hours of generation.
• There is the need for a robust tracking system of all supplies.
• Implement conservation practices and tracking, particularly for fluids, to reduce any waste of unused fluids per treatment.
• Anticipate additional machine and supply needs early.
• Some hospitals estimated an increase need in machines of between 25-30%.
• It is important to look at each hospital’s experience to determine if a time between admission to the ICU and the start of RRT can be projected to plan for supply and staffing decisions.

Best Practice Recommendations
• Develop and test the organization’s supply and machine tracking system.
• Early communication is essential.
• Develop and plan with algorithms to manage treatment options based on availability and implement conservation practices, particularly for fluids, to ensure exact amount of fluids by bag to eliminate unused fluid waste.
• Develop an algorithm to predict surge in advance of the occurrence so supplies and staffing can be secured.
• Establish a protocol for accessing acquisitions of equipment to ensure they meet facility requirements and are aligned with other acquisitions of staffing, disposables and fluids to optimize treatment capabilities and capacity in advance of an emergency.

Hospital Dialysis Innovation and Surge Strategies

Discussion Highlights
• One facility developed a Stress Resource Planning Document and has shared it for others to use.
  o Delineates how available dialysis machines and disposables would be utilized
• A facility developed a protocol for utilization of scarce resources, describing:
The use of PIRRT

Shifting CRRT machines with 24/7 usage for as long as possible with a 24-hours on and 24-hours off schedule which was adequate for most patients; this doubled their capacity (20 machines doing the work of 40 machines), however, this process also doubled the disposable consumption rate (twice the number of filters and double the dialysate consumption) to achieve adequate clearance.

- Logistics of managing persons, machines, and disposables was a big challenge discovered as the surge increased.

- Innovative clinical strategies were discussed, including:
  - Novel fluid generation
    - Regular intermittent hemodialysis machines were utilized to make bicarbonate based dialysate.
    - This dialysate was used only for CVVHD per FDA guidance and not used as a replacement fluid (ultra –pure, but not sterile).
    - One participant suggested that only new machines that had never been used on patients be used to generate dialysate.
    - A COVID-free space is needed to connect to central RO as well as accommodate all the space needed for the entire set up.
    - Testing was done to ensure the expected electrolyte concentration was achieved in accordance with FDA requirements; bags used for testing are not used in patient care.
    - Effort was led by the hospital’s acute dialysis lead, along with their bio-medical staff.
    - A staffing plan for 2-3 FTEs was in place and met the daily needs.
    - It was difficult to find disposables needed to create the solution (sterile bags, appropriate connections, including “Y” DIN connectors, and tubing); use of new effluent bags should be considered.
  - Anticoagulation issues appear to be less frequent with subsequent waves of COVID-19.
    - The few facilities who had pre-existing citrate protocols and trained staff were able to manage a change to citrate without problems.
    - Existing heparin protocols were modified and PTT targets increased to nearly twice normal ranges.
  - Acute PD and dialysis access
    - In some hospitals, interventional radiologists placed acute PD catheters for patients on the general hospital units; other hospitals reported that the interventional radiologists were not comfortable placing acute PD catheters at the bedside.
    - Surgeons performed acute PD catheter placement at the bedside.
    - There were a limited number of survivors treated with acute PD; however, this modality is not permitted for out-patient AKI patients, so they required another surgery for hemodialysis catheter placement when they were stable on PD.
    - Frequent renal function monitoring is standard in the outpatient PD setting, and PD may provide some benefit in terms of conserving residual renal function.
• Predicting a surge is difficult and a surge can happen rapidly and without much warning.
• The public knew about issues with shortages in ventilators, yet no one was talking about shortages in dialysis machines and supplies, nor staff trained to perform RRT.
• It was suggested that the government could cast a wider net to assess all types of intensive care requirements as ICU/ventilator care was initially the primary focus and that better government- and industry-led discussions are needed regarding regionalizing stockpiles to prevent delays due to equipment shipping from coast to coast, and effectiveness of limited equipment resources.
• While there has been awareness of the shortage of dialysis nurses for a long time, the magnitude was not fully realized. This is a nationwide problem within nursing in general and it is recommended that the government examine and address the nursing shortages, particularly for specialized fields. In a second surge, facilities may not be able to recruit traveling nursing staff to meet all staffing needs. Every institution should be fully aware of their nursing capacity and activate earlier to ensure access to more nursing through alternate options and also competing regional dependencies on the same resources (e.g. volunteer, traveling, outpatient, contract, etc.).

Lessons Learned
• Sharing information and disseminating it as broadly and quickly as possible with collaboration with federal partners and the ASN Response Team was most helpful; the helpfulness of individuals from CDC and the information provided by the CDC were of huge benefit.
• Tools were needed to manage machine allocations and available tools were modified in an effort to make the use of machines adaptable.
• Regarding generating fluids locally—it is possible to fill a fluid shortage gap by generating dialysate locally; however, a protocol, space, machines and personnel to accomplish this activity must be ensured and trained
  o Generated fluid need to be used as soon as possible but no longer than 24 hours after it is produced.
  o Some hospitals doubled the frequency of RO testing.
  o Microbiology testing was performed each day and fluid from that batch was not released prior to receiving the results of testing.
  o Endotoxin testing may be done through the Blood Bank.
  o Bags cannot be transported between facilities and need to be used where they are made.
  o Sourcing bags with the appropriate ports is difficult.
    ▪ Fill port (DIN connector)
    ▪ Spike port for connecting back to CRRT circuit
    ▪ Sampling port if sample to be drawn for testing.
• The hospital’s research programs slowed or stopped, allowing the availability for multiple research coordinators to help coordinate logistics for renal services.
• When citrate anticoagulation was used, some facilities saw an increase in clotting which necessitated the re-evaluation of their citrate protocol; increased clotting had an enormous effect on circuit failure and staff time.
• Patients with a less-than-optimal access do not do well; decision tools were developed to assist with correct access choice.
• As fluids for CVVHD became critically low, one facility used 1.5% peritoneal dialysis fluid; this was not as successful as hoped as patients became hyperglycemic; the approach did help in treating patients with hyperkalemia and bridged a gap through a crisis period.
• Leveraging acute PD and urgent start PD facilitates out-patient PD rather than out-patient hemodialysis. This can offload in center capacity and minimize COVID exposure.

Best Practice Recommendations
• Develop a “just-in-time training” approach for staff utilizing a small pool of nurses and the in-patient dialysis educator; implement a train-the-trainer approach.
• If faced with a machine shortage, review other machine options which became available to U.S. facilities through FDA approved Emergency Use Authorization that was possible due to the national public health emergency declaration (e.g. machines from Canada, or the European Union).
• Use existing relationships with suppliers to assist in obtaining extra solutions.
• A multidisciplinary task force should be quickly formed which meets daily and considers the demands on a day-to-day basis, including monitoring the RRT needs and every aspect of RRT (plumbing to allow dialysis in patient rooms to avoid transporting patients, CRRT supplies, burn rate, communicating with vendors for supplies, obtaining machines from a home hemodialysis unit or via rental, tracking disposables via Google spreadsheet) and staffing; consider implementing a team approach to patient care.
• Educate the emergency preparedness community about critical supportive care needs in the intensive care setting, to include dialysis and CRRT in the care of patients with COVID-19 and other infections that cause kidney damage.
• Anticoagulation
  o Follow the anticoagulation protocol that makes the most sense for your facility; an emergency situation is not the time to move to an unfamiliar treatment.
  o More research is needed to establish a standard of care that clarifies which type of anticoagulation is better than the other (heparin vs. citrate) and the monitoring strategy (monitoring anti-Xa levels vs. PTT levels).
• Identify opportunities to expand government and industry led discussions to explore options for increasing domestic U.S. access to renal replacement therapy machines and fluids for COVID-19 and in the event of future pandemics.
• Identify opportunities to explore with government potential opportunities to incentivize nursing programs to recruit and expand specializations in nursing to address current and projected shortages.
# Appendix A: ASN and HHS Scarce Resource Roundtable

## List of Attendees

<table>
<thead>
<tr>
<th>Kidney Care Partners</th>
<th>Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alan S. Kliger, MD</td>
<td>Yale School of Medicine</td>
</tr>
<tr>
<td>Anitha Vijayan, MD, FASN</td>
<td>Washington University in St. Louis</td>
</tr>
<tr>
<td>Ashita J. Tolwani, MD, MS</td>
<td>University of Alabama at Birmingham</td>
</tr>
<tr>
<td>Debbie Cote, MSN, RN, CNN, NE-BC</td>
<td>National Renal Administrators Association</td>
</tr>
<tr>
<td>Faith Lynch, MSN, RN</td>
<td>American Nephrology Nurses Association</td>
</tr>
<tr>
<td>Glenda V. Roberts</td>
<td>Kidney Research Institute at the University of Washington</td>
</tr>
<tr>
<td>Harold M. Szerlip, MD, FASN</td>
<td>Baylor University Medical Center</td>
</tr>
<tr>
<td>Javier A. Neyra, MD, MS, FASN</td>
<td>University of Kentucky Medical Center</td>
</tr>
<tr>
<td>Jay L. Koyner, MD</td>
<td>University of Chicago</td>
</tr>
<tr>
<td>Jeffrey I. Silberzweig, MD</td>
<td>The Rogosin Institute</td>
</tr>
<tr>
<td>Jeffrey Perl, MD</td>
<td>St. Michael's Hospital</td>
</tr>
<tr>
<td>Juan Carlos Q. Velez, MD, FASN</td>
<td>Ochsner Clinic Foundation</td>
</tr>
<tr>
<td>Kathleen D. Liu, MD, PhD, FASN</td>
<td>University of CA at San Francisco School of Medicine</td>
</tr>
<tr>
<td>Liz McNamara, MSN, RN</td>
<td>Northwest Kidney Center</td>
</tr>
<tr>
<td>Michael Heung, MD, MS, FASN</td>
<td>University of Michigan</td>
</tr>
<tr>
<td>Michael J. Connor, Jr., MD</td>
<td>Emory University</td>
</tr>
<tr>
<td>Michele H. Mokrzycki, MD, MS, FASN</td>
<td>Montefiore Med Ctr, Albert Einstein College of Medicine</td>
</tr>
<tr>
<td>Michelle A. Josephson, MD, FASN</td>
<td>University of Chicago</td>
</tr>
<tr>
<td>Raghu V. Durvasula, MD</td>
<td>University of Washington Medical Center</td>
</tr>
<tr>
<td>Shweta Bansal, MBBS, MD, FASN</td>
<td>University of Texas Health at San Antonio</td>
</tr>
<tr>
<td>Sumit Mohan, MD, MPH, FASN</td>
<td>Columbia University</td>
</tr>
<tr>
<td>Talat Alp Ikizler, MD, FASN</td>
<td>Vanderbilt University Medical Center</td>
</tr>
<tr>
<td>Tracy Wellington, RN</td>
<td>Northwest Kidney Center</td>
</tr>
<tr>
<td>Zain Mithani, MD</td>
<td>University of Miami</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Federal Partners</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shannon Novosad, MD, MPH</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>Jesse Roach, MD</td>
<td>Centers for Medicare &amp; Medicaid Services</td>
</tr>
<tr>
<td>Kristen Finne</td>
<td>U.S. Department of Health and Human Services/Office of the Assistant Secretary for Preparedness and Response</td>
</tr>
<tr>
<td>Frank P. Hurst, MD, FASN</td>
<td>U.S. Food and Drug Administration</td>
</tr>
<tr>
<td>Gema Gonzales</td>
<td>U.S. Food and Drug Administration</td>
</tr>
<tr>
<td>Michelle Tarver, MD, PhD</td>
<td>U.S Food and Drug Administration</td>
</tr>
<tr>
<td>Ana-Claire Meyer, MD, MSHS</td>
<td>Department of Defense</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASN Staff</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Susie Stark</td>
<td>Kerry Leigh, RN</td>
</tr>
<tr>
<td>Darlene Rodgers, RN</td>
<td>Matt Howard</td>
</tr>
<tr>
<td>Glenda Harbert, RN</td>
<td>Javier Rivera</td>
</tr>
<tr>
<td>Bonnie Freshly, MEd</td>
<td>Rachel Meyer</td>
</tr>
</tbody>
</table>
## Appendix B: Shared Resources from the ASN-HHS Roundtable

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>Resource (File type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool</td>
<td>Columbia University CRRT Sharing Dashboard (Excel)</td>
</tr>
<tr>
<td>Tool</td>
<td>Columbia University Census Tracking Dashboard (Excel)</td>
</tr>
<tr>
<td>Article</td>
<td>Columbia University Disaster Planning Dashboards (PDF)</td>
</tr>
<tr>
<td>Algorithm</td>
<td>Columbia University CRRT Anticoagulation Pathway (PDF)</td>
</tr>
<tr>
<td>Presentation</td>
<td>Columbia University Dialysate Production for CVVHD (PPT)</td>
</tr>
<tr>
<td>Article</td>
<td>Columbia University Divisional Disaster Planning (PDF)</td>
</tr>
<tr>
<td>Tool</td>
<td>Emory Healthcare CRRT ICU Education Cards-(anticoagulation and catheter length guidance) (PDF)</td>
</tr>
<tr>
<td>Guidance</td>
<td>Emory Healthcare Acute RRT for Critically Ill Patients in ICU Settings During Respiratory Pandemic (PDF)</td>
</tr>
<tr>
<td>Tool</td>
<td>Emory Healthcare Quick Reference-Improving CRRT Circuit Performance in COVID+ Patients (PDF)</td>
</tr>
<tr>
<td>Tool</td>
<td>Emory Healthcare RRT Surge Plan.pdf</td>
</tr>
<tr>
<td>Article</td>
<td>Montefiore Medical Center Providing Care to Patients with AKI and COVID-19 Infection: Experience of Front Line Nephrologists in New York (PDF)</td>
</tr>
<tr>
<td>Article</td>
<td>Montefiore Medical Center Urgent PD in Patients with COVID-19 and AKI (PDF)</td>
</tr>
<tr>
<td>Presentation</td>
<td>University of Michigan Connectology for Emergent CRRT Dialysate Solution Preparation Using In-House Supplies (PPT)</td>
</tr>
<tr>
<td>Guidance</td>
<td>University of Michigan CRRT Regional Citrate Anticoagulation Protocol for MDs (PDF)</td>
</tr>
<tr>
<td>Guidance</td>
<td>University of Michigan Adult CRRT Regional Citrate Protocol (Prismaflex) for RNs (PDF)</td>
</tr>
<tr>
<td>Article</td>
<td>University of Michigan COVID-19 and Renal Replacement Therapy Decision Making (PDF)</td>
</tr>
<tr>
<td>Article</td>
<td>University of Kentucky Preparedness of Kidney Replacement Therapy in the Critically Ill During COVID-19 Surge (PDF)</td>
</tr>
</tbody>
</table>

These resources are available as part of the [ASN COVID-19 Toolkit for Nephrology Clinicians: Preparing for a Surge](https://www.asn-online.org/covid-19/HHSRoundtable).

These resources may be accessed directly at this link: [https://www.asn-online.org/covid-19/HHSRoundtable](https://www.asn-online.org/covid-19/HHSRoundtable)
### Appendix C: ASN and HHS Scarce Resource Roundtable Agenda

**Session One: Tuesday, July 28, 2020**

<table>
<thead>
<tr>
<th>Agenda Topic</th>
<th>Questions</th>
<th>Identify the “Top 3”</th>
<th>Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:30 p.m. to 4:40 p.m. ET</td>
<td>Welcome</td>
<td>Framing and focus on these roundtable discussions</td>
<td>4:30 p.m. to 4:40 p.m. ET</td>
</tr>
</tbody>
</table>
| 4:40 p.m. to 4:50 p.m. ET | Hospital Dialysis Surge: Emergency Planning, Situational Awareness, and Reporting Protocols | To address hospital COVID-19 surge:  
  - Were there knowledge gaps identified in coordination or other aspects including planning, situational awareness, or reporting protocols?  
  - In hindsight, what trainings and/or information would have been helpful in supporting your efforts? | Challenges  
  - Successes  
  - Recommendations | Jeff Silberzweig, MD |
| 4:50 p.m. to 5:20 p.m. ET | Staffing shortage challenges and potential surge options and training needs | During COVID-19 related staffing shortages:  
  - How did your hospital identify dialysis staffing needs and request additional staff?  
  - Did staffing shortages result in conservation and scarce resource strategies being implemented for CRRT and dialysis care?  
  - Was other hospital nursing staff and technician staff reassigned to your unit?  
  - Were they based on type of expertise or staffing availability?  
  - If so, how?  
  - What cross training could have helped surge staff more quickly support the acute dialysis shortage needs?  
  - What would be the preferred lead time required and modality for cross training staff? | Challenges  
  - Successes  
  - Recommendations | Kathleen Liu, MD (invited)  
  Debbie Cote, RN |
### Session One: Tuesday, July 28, 2020

<table>
<thead>
<tr>
<th>Agenda Topic</th>
<th>Questions</th>
<th>Identify the “Top 3”</th>
<th>Facilitator</th>
</tr>
</thead>
</table>
| 5:20 p.m. to 5:50 p.m. ET                        | With regard to regional and facility-based CRRT and dialysis supply shortages and monitoring: | - Did you have or did you establish a protocol for monitoring your hospital’s RRT machine and supply capacity?<br>- What approaches did or are you currently taking to monitor and work with hospital management to ensure access to critical CRRT/dialysis supplies?<br>- Did you establish or were there existing decision-making protocols for allocation of scarce RRT supply and machine resources at your facility?<br>  
  o If yes, did they differ across your healthcare network/system?<br>- How did supply issues differ between large urban organizations and smaller organizations in suburban/rural areas?<br>  
  o What would be the best steps for nephrologists to take to prepare for conditions in these different areas? | - Challenges<br>- Successes<br>- Recommendations<br>Request, if available<br>  
  - Sample algorithms<br>  
  - Sample monitoring processes/reporting strategies<br>  
  - Sample hospital dialysis surge emergency plans or processes | Alp Ikizler, MD |
| 5:50 p.m. to 6:00 p.m. ET                        | Wrap Up                                                                  | Summarize, next steps, introduction to next session on Thursday, July 30th at 4:30 pm ET | Alan Kliger, MD     |

**Session One Adjourns**
<table>
<thead>
<tr>
<th>Agenda Topic</th>
<th>Questions</th>
<th>Identify “Top 3”</th>
<th>Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome</td>
<td>Overview of July 28th session discussion and introduction of the agenda for today</td>
<td></td>
<td>Alan Kliger, MD</td>
</tr>
</tbody>
</table>
| 4:40 p.m. to 5:50 p.m. ET | Hospital Dialysis Surge Strategies and Innovation | To address COVID-19 in hospital RRT surge strategies and innovation:  
• How did you anticipate when you would need to implement hospital dialysis conservation or scarce resource strategies?  
• What indicators did you use to inform decisions regarding implementation of conserving/scarc resource strategies?  
• How would you propose decisions be made regarding patient treatment options when it is necessary to implement conservation strategies?  
• What were the innovative clinical strategies that you implemented to address the dialysis surge demand?  
• Nephrologists reported a critical need to create or compound dialysate and CRRT fluids due to severe fluid shortages:  
  o How did you interface with FDA regarding alternative solutions?  
  o How soon in the surge process did you adapt protocols to create/compound fluids?  
• Based on your experience, what would be the most critical immediate actions a facility should take if they are about to face a potential COVID dialysis surge scenario?  
• Challenges  
• Successes  
• Recommendations | Request:  
• Sample clinical algorithms for conservation and scarce resources  
• Sample Clinical Best Practices  
• Sample conservation and or scarce strategies and other informational resources  
• Any other materials they relied on or could have been helpful | Jeff Perl, MD  
Liz McNamara, RN |
<table>
<thead>
<tr>
<th>Agenda Topic</th>
<th>Questions</th>
<th>Identify “Top 3”</th>
<th>Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>5:50 p.m. to 6:00 p.m. ET</td>
<td>Wrap up</td>
<td>Summarize, next steps, discussion about report</td>
<td>Alan Kliger, MD</td>
</tr>
</tbody>
</table>

Session 2 Adjourns