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COVID-19

RIISING TO THE CHALLENGE



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January 31 – February 12, 2021

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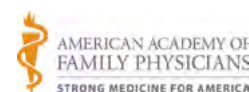
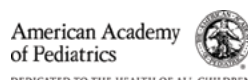
As the COVID-19 pandemic evolves, experts predict a second wave of infection. Ensure that you are equipped with the latest information and clinical knowledge as the disease continues to spread. Join clinicians from around the world, from the convenience of your home or office, to seek evidence-based solutions to improve outcomes for COVID-19 patients.

Course highlights include:

- Plenary lecture by Anthony S. Fauci, MD, director of the National Institute of Allergy and Infectious Diseases and a U.S. leader in the fight against the COVID-19 pandemic
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**COVID-19
RISING TO THE
CHALLENGE**



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IN DECEMBER 2019, A CLUSTER OF PATIENTS WITH PNEUMONIA CAUSED BY A NOVEL CORONAVIRUS WAS REPORTED IN WUHAN, CHINA, AND THE WORLD AS WE KNOW IT CHANGED. Across the United States, critical care clinicians, health systems, and professional societies worked feverishly to prepare for what was ahead. When the pandemic hit, our well-being was challenged, both mentally and physically. Smiling faces on rounds were replaced by expressions of anxiety, fear, and fatigue, albeit hidden behind surgical masks and face shields. Nevertheless, the value of the multiprofessional team was accentuated. Relationships were strengthened and new bonds were formed. We were in this together.

I am reminded of a quote by Joseph Campbell: "A hero is someone who has given his or her life to something bigger than oneself." As I walk through my own ICU, this label applies uniformly. I'm sure you feel the same way about yours. Despite the trials and tribulations that COVID-19 has fashioned, you have risen to the challenge to provide the Right Care, Right Now. Appropriately, the theme of this issue of Critical Connections is "Rising to the Challenge of COVID-19."

In his column, SCCM President Lewis J. Kaplan, MD, FACS, FCCP, FCCM, highlights the many contributions made by the Society, including the valuable educational resources that are available to all clinicians worldwide. Dr. Kaplan also describes the importance of recognizing the less obvious innovations that support our everyday workflow and the importance of taking time for self-care. The most important resource during this pandemic is each and every one of us.

As the COVID-19 pandemic spread across the globe, institutions throughout the United States planned and prepared for the anticipated surge of patients to their hospitals. In the article, "How a Master of Critical Care Medicine Prepared for the Coronavirus Pandemic," former SCCM President Philip S. Barie, MD, MBA, MCCM, provides valuable insight into coordinating a disaster management action plan. Dr. Barie has been at the forefront of the response to three mass casualty incidents in New York City. While each was unique, we are advised to think two steps ahead so we can act one step ahead. Similarly, clinicians from two major New York City hospitals share their response stories, including Richard H. Savel, MD, CPE, FCCM, who shares how SCCM's Fundamental Disaster Management course helped Maimonides Medical Center in Brooklyn, New York, stay prepared.

Finally, I encourage you to read the section "Profiles in Courage," which highlights five SCCM members and their personal stories from the front lines. These emotional passages truly exemplify the dedication of these—and all—critical care professionals as we collectively reflect on the psychological bearings of COVID-19. Sherif Afifi, MD, FCCM, cites four insightful words that have had a positive impact on patients: "You are not alone." These four words also apply to us within the critical care community.

From the onset of the pandemic, SCCM has been rapidly developing and deploying resources to aid in the care of critically ill patients. A timeline of events is summarized in this issue of Critical Connections. This response is only possible because of the incredible membership and tremendous staff at SCCM.

I am honored and excited to begin my term as editor of Critical Connections. I hope you are enlightened by the content of this issue and continue to enjoy this as a benefit to your membership. As always, feedback on Critical Connections is welcomed at criticalconnections@sccm.org.

CriticalConnections

THE COMPLETE NEWS SOURCE FOR
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Triumph Amidst Crisis



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WE WERE NOT PREPARED, YET WE STOOD READY. DISASTER MANAGEMENT EDUCATION, TRAINING, AND EVEN IMPLEMENTATION WERE BELIEVED TO BE NECESSARY AND SUFFICIENT. We believed that we were prepared. The novel coronavirus 2019 (COVID-19) pandemic clarified that such preparation was indeed necessary but by no means sufficient. For individual hospitals as well as integrated healthcare organizations, mass casualty, as well as natural and man-made disaster planning, shelters under an all-hazards approach. COVID-19 brought all too many hazards instead. It is those hazards—insufficient personal protect equipment (PPE), inadequate critical care beds, scarce ventilators, and even too few experienced ICU clinicians—that threatened our patients' lives while imperiling our safety. And it all occurred without a clearly successful virus-specific therapy. Such challenges threaten to topple systems. It is in response to these daunting tasks that our members, and our Society, embraced new approaches and drove innovative means of patient rescue.

The Society of Critical Care Medicine (SCCM) is well regarded for education. Cornerstone programs such as Fundamental Critical Care Support (FCCS) and Fundamental Disaster Management (FDM) formed the core of what was to blossom into a suite of COVID-19 resources. Importantly, these treasures were not sheltered behind a pay wall. They were instead provided as free

open-access medical education (FOAMED) to all. Hundreds of thousands of clinicians accessed these programs! One of the driving forces behind their use of SCCM education is an SCCM-crafted assessment of U.S. ventilator and clinician resources authored by Neil A. Halpern, MD, MCCM, titled United States Resource Availability for COVID-19 and available at sccm.org/icuresourceavailability. Besides numeric data, the FDM tiered-staffing approach was featured as one way to staff novel ICUs where there were not enough existing ICU teams to do so. Attending physicians, fellows, and residents alike have been trained to help in the ICU by using these educational resources. In concert with changes in information, and how information is being used at the bedside, this living document undergoes regular revision during the pandemic.

Besides delivering high-quality bedside care, there is new information to share and knowledge to acquire. You may have noted SCCM's programs, members, and leaders frequently appearing in print and online media as well as occasionally on the evening news. Leaders throughout the Society have been engaged with a host of federal agencies, from the Centers for Disease Control and Prevention to the Federal Emergency Management Agency, to the White House. Admiral Brett P. Giroir, MD, a pediatric intensivist by training, is integral to ongoing supply chain efforts to address several aspects of shortages. Dr. Giroir is featured within our disaster page specifically devoted to COVID-19—a new aspect of the website. Visit sccm.org/disaster/covid19 to access.

On that page, you will also find a rapidly created registry titled Viral Infection and Respiratory Illness Universal Study: COVID-19 Registry (VIRUS), which engages members and nonmembers alike to share information about COVID-19 patient care. We hope that you will all share data so that we may together learn how best to care for patients during crises like this one. Despite our most fervent wishes, this crisis will not be the last one we will face together. VIRUS also includes a section for those who have ventilated more than one patient at a time using only one ventilator. While we anticipate that this is a rare event, the desire to save lives will drive innovation.

Some innovations will garner tremendous attention. It is, however, the less obvious

Many of our communities have responded with overwhelming outpourings of support. Food truck meals delivered fresh throughout the day and night, surprise pizza deliveries, care packages from unknown benefactors, and even PPE donations serve heartwarming tales of unity.



innovations, the ones that make everyday workflow manageable during a crisis, that also deserve our attention. New note templates, order sets, and transport routes are the unsung heroes of daily care—but are critical nonetheless. Creative approaches to face and eye shields may seem less exciting than ECMO, but are as essential as the clinicians at the bedside—and on a much larger large scale. Everyone from lab technicians to cleaning staff needs to be protected. Many of you have spent large portions of clinical time in powered air-purifying respirators (PAPRs) either during airway control, surgery, bron-

choscopy, or airway liberation. While there is no innovative way to address the need for that kind of high-level protection, there are ways to bring you comfort.

Many of our communities have responded with overwhelming outpourings of support. Food truck meals delivered fresh throughout the day and night, surprise pizza deliveries, care packages from unknown benefactors, and even PPE donations serve heartwarming tales of unity. “Light the Night” celebrations, heart-shaped arrangements of police cruisers with lights ablaze outside of hospital emergency department entrances, and other

creative ways of honoring healthcare workers like you are unprecedented and welcomed. Sometimes these innovations help shape care, while others simply remind you that someone else cares. Clearly innovation arises within and without the medical community to which we all belong.

Some of you, like me, have been fortunate to spend some time working from home. Never before has the boundary between work and home balance been thrown into such sharp contrast. As we continue to struggle with patient management, plans for emerging into a new normal, and new processes for education, I encourage you to embrace the (few) quiet moments in between. Remember what guided you into critical care. Recall simple joys that buoyed you during uncertainty. Relish triumphs in which you have played a part during this crisis. And then share those memories with those you treasure both at work and at home. Take time for self-care, for you are truly our most precious resource.

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For hospitals in surge cities, novel coronavirus 2019 (COVID-19) was a disaster such as they had never seen before. Most disasters—natural, nuclear, mass shootings, and other forms of terrorism—are one-time events that quickly overwhelm intensive care units (ICUs) and then ease within a few days. COVID-19 was a “mass casualty in reverse,” said Richard H. Savel, MD, CPE, FCCM, director of adult critical care services and vice-chair for inpatient clinical services in the Department of Surgery at Maimonides Medical Center in Brooklyn, New York, a hotbed of the COVID-19 outbreak. ICU needs grew steadily—rather than all at once—and then remained at high levels for weeks without a break. Between its first COVID-19 case on March 9 and the peak on April 21, Maimonides transformed from a 700-bed hospital with one 20-bed medical ICU and 57 ICU beds, to a hospital with 10 ICUs and 140 ICU beds.

While no hospital was truly prepared for COVID-19, Dr. Savel said that, because he had taken the Society of Critical Care Medicine's Fundamental Disaster Management (FDM) course twice and taught it twice during the past decade, Maimonides was in a far better position. “Our COVID-19 cases are dropping and, while we're still addressing the pandemic, to the extent that we got through the worst of it, it was due to this course,” said Dr. Savel. “I remain eternally grateful for every drop of information I gleaned from it.”

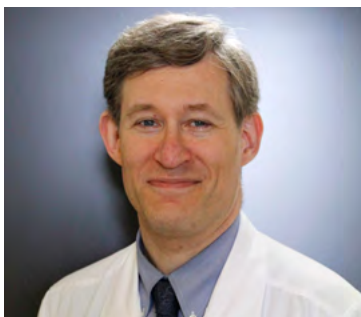
The FDM course focuses on the role of the critical care specialist in managing disasters. Dr. Savel recommends that all attending physicians and fellows take the course. During the New York City outbreak, Dr. Savel's role at Maimonides was as the “boundary spanner,” meaning that he acted as the interface between critical care clinicians and operational leadership. Constant communication was of the utmost importance, and he rounded with those



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▲ New York, NY - April 1, 2020: View of Maimonides Medical Center in Brooklyn where patients with COVID-19 have been treated

CONVERTING A CHILDREN'S HOSPITAL PICU INTO AN ADULT COVID-19 ICU



Richard H. Savel, MD, CPE, FCCM

groups twice daily. Ultimately, he was part of the team responsible for ensuring that the hospital had enough staff, equipment, and rooms to treat COVID-19 patients. There was no time to employ normal protocols, and decisions that normally took months were made in minutes, by necessity. Through it all, he was impressed with the dedication of the staff, all of whom faced daunting experiences every day. "I've never been prouder to be part of a critical care community," he said.

He noted a number of important take-aways from the FDM course that applied to the pandemic, beginning with having a disaster plan in place, employing rules that have been agreed upon in advance and must be adhered to. He said five key lessons learned from FDM apply directly to pandemic management:

- 1. Employ a military approach to planning.** A military-style structure will help ensure that you are making optimal use of resources.
- 2. Set up a hospital command center.** Critical care specialists should be in charge and work directly with hospital leadership while overseeing work groups that address specific issues, such as pharmacy, operations, and ventilator management. Plan for twice-daily conference calls to discuss status and needs.
- 3. Protect clinicians first.** Ensure that there is enough personal

As part of its emergency response, Montefiore Medical Center quickly converted a pediatric intensive care unit (PICU) into an adult COVID-19 intensive care unit (ICU). The Society of Critical Care Medicine's (SCCM) iCritical Care podcast host Margaret M. Parker, MD, MCCM, sat down with H. Michael Ushay, MD, PhD, FCCM, for an in-depth discussion of that conversion, lessons learned, and what the future holds. Listen to the full podcast (episode SCCM-Pod 418) at sccm.org/podcast.

Dr. Parker: *Can you tell us why converting your pediatric hospital into an adult COVID-19 hospital was necessary?*

Dr. Ushay: People saw this coming. Admissions were rising, and when you look at the kinetics of the number of patients and how they increased, it's really startling. It was one patient, then two patients, then four patients. It fulfilled this whole geometric progression of epidemiology in a scary way.

The New York governor and health commissioner mandated that every hospital double its ICU capacity. The baseline ICU capacity of Montefiore, not including pediatric beds, is about 106 ICU beds. So Montefiore had to double that, realizing that the chances of someone needing ICU care were extraordinarily high.

In pediatrics, we talked early on about increasing the age range of admission for the PICU. On March 25, I got a call asking us to take a 22-year-old patient because the adult ICU was full. Since that point, we have averaged about 10 intubated adults ranging initially between ages 21 and 30. Our oldest patient in the PICU was 59.

We also converted one of our pediatric floors to an adult COVID-19 floor. A 38-bed medical/surgical pediatric floor was converted, which was filled instantly with emergency department backlog. Pediatric hospitalists and cardiologists staffed the floor, with assistance from adult physician assistants. We also converted our postanesthesia care unit in the children's hospital into an adult ICU that was staffed and directed by adult surgeons.

I really take my hat off to the pediatric hospital medicine and subspecialty attending physicians, residents, and fellows who adapted so quickly to caring for adult patients who were much sicker than the patients they had cared for since medical school. In the PICU, we are always exposed to critical illness, and adapting to adults was relatively easy. I think it was much harder on the floors, and I have a great deal of respect for these teams.

Dr. Parker: *How was the comfort level among the pediatric healthcare professionals who now were being asked to care for adults?*

Dr. Ushay: Traditionally, if we tried to admit an adult patient to our PICUs, the amount of pushback would be astronomical. But in this situation, there's been very little pushback from anyone. And certainly there was a ton of

nervousness up front about it. I'm really proud of the department and the pediatricians; they've met the challenges extremely well.

For example, conversations about do-not-resuscitate and do-not-intubate orders are very different between adults and pediatrics. We're usually talking to parents so we know how to do that. But it's different when you are talking to a 30-year-old adult with two kids and a wife and realizing that they are about to get intubated and may not get extubated.

Dr. Parker: *Presumably, once this COVID-19 crisis resolves or as the curve slowly decreases, you will eventually convert back to a children's hospital. How do you plan to do that?*

Dr. Ushay: In disaster management, you're supposed to think about return to normalcy at the same time you're ramping up. I imagine that eventually the extra ICUs that have been set up in the medical center will be disbanded as capacity in what they call the "legacy ICUs" returns.

Dr. Parker: *What lessons have been learned?*

Dr. Ushay: One personal lesson I learned occurred when we initially thought that we should round at a distance. It was very easy to separate ourselves from the patient and the bedside nurses. That created a little bit of uneasiness and unhappiness because we're really asking our bedside nurses and respiratory therapists to put themselves in harm's way. They started feeling somewhat disrespected by the medical team, who were sitting at a distance and giving directions. A nurse would be in room for an hour, leave the room, and a resident would come up to that nurse and say, "Oh, that blood sample we just drew hemolyzed. Will you go in and draw another?" It's a big procedure to don and doff PPE to go into these rooms, and that became a source of friction. So we've really stressed ensuring integrity and appreciation between the physicians and the rest of the medical team.

Dr. Ushay is a professor of pediatrics, interim chief of the Division of Pediatric Critical Care Medicine and medical director of the PICU at the Children's Hospital at Montefiore and the Pediatric Hospital for Albert Einstein College of Medicine in the Bronx, New York, USA.



Clinical Spotlight: COVID-19

protective equipment to keep all clinicians safe, which will decrease their risk of becoming infected and straining already-stretched resources. This means ensuring that clinicians are fully protected before they run to help a patient in distress.

4. **Understand that triage is critical.** Critical care specialists should remain in the ICU, where they will be first receivers who are prepared and ready to act. For many (if not most) hospitals, ICU beds are a limited resource, and having real-time, dynamic evaluation and reevaluation by a critical care triage officer or critical care triage committee helps determine which patients should be in those beds—a key aspect to providing optimal outcomes.
5. **Employ situational awareness.** Inventory and fully understand your “staff, stuff, and space” to ensure that you are working as a coordinated team and have an awareness of supply chains, operations, staff, beds, ICU space, oxygen system adequacy, etc. so you can go back up the chain of command as soon as you see a problem developing. Operationalize clinical issues hour by hour, day by day, maximizing the critical care resources you have and working closely as a team with the hospital command center to provide real-time information while also planning ahead. Today you could be running out of gloves, tomorrow you may experience a staff shortage because several have tested positive for COVID-19, the next day you might run into drug shortages.

“Every mass disaster brings new insights for future planning, and so it is with COVID-19, and we’re still learning about them,” said Dr. Savel. He noted a number of unanticipated logistical challenges that arose. For example, patients are on mechanical ventilation far longer than is typical, prompting the need to open up more and more ICUs. Because COVID-19 is so contagious, his team moved ICU pumps outside of patients’ rooms

to reduce the exposure risk to healthcare workers. Because family members were not allowed to visit, critical communication with loved ones, which used to be routine, became much more challenging. In response, Maimonides rapidly set up an innovative family communication center leveraging the electronic health record and having physicians who were not on the front lines of care provide that communication.

Dr. Savel said they learned that more intensivists than expected were needed to ensure the highest level of care, so the hospital hired temporary critical care specialists. And the mental distress for health-care staff was beyond anything previously experienced. It is vital to acknowledge how daunting the job is day after day and to provide mental health support.

Now that the number of COVID-19 cases is dropping, Maimonides is in the process of ramping down from the surge but is preparing for the next wave by keeping one extra ICU open. The hospital worked on creating a safe environment for all patients, with parallel pathways for those with COVID-19 and those without. Every hospital must figure out how they will handle this issue to continue to provide quality care while remaining solvent, within the confines of their structure. For health systems with more than one building, one could be dedicated to COVID-19 care and the other to non-COVID-19 care. At one-structure hospitals such as Maimonides, it may involve floors dedicated to COVID-19 patients and floors dedicated to other patients.

“As a world, we need to prepare to have COVID-19 as part of our existence, less as disaster management and more as our new reality,” said Dr. Savel. “We need to be ready to provide high-quality healthcare to patients who have the disease—including being ready to have an ICU or ICUs full of patients—while also being able to care for patients who don’t have the disease but need procedures done.”



Photo: lev radin / Shutterstock.com

▲ New York, NY - April 1, 2020: General view of emergency entrance at Maimonides Medical Center in Brooklyn where patients with COVID-19 have been treated

A PHARMACIST'S PERSPECTIVE OF THE COVID-19 PANDEMIC RESPONSE AT THE EPICENTER

On March 1, 2020, the first case of COVID-19 in New York City initiated a snowball effect that brought an overwhelming surge of patients to healthcare systems. The highest per capita infection rate was in the Bronx, where our multicentered urban academic medical center, Montefiore, stands. For every 100,000 residents, there were 3,172 cases, 822 hospitalizations, and 249 deaths.¹

Health system pharmacy staff worked tirelessly behind the scenes, dispensing medications, providing adequate drug supply in automated dispensing cabinets, and creating emergency medication kits for intubation, rapid responses, and cardiac arrests, while clinical pharmacists supported the front line.² Clinical pharmacists contributed to vital resource documents, education, and training.

To strengthen the front line, physician and nursing staff were redeployed while the ranks of other practitioners, such as clinical pharmacists, did not increase as rapidly as needed to keep pace.³

Clinical Pharmacists Play a Vital Role on the Front Line

During the past few months, clinical pharmacists solidified their roles on the front lines of the COVID-19 pandemic.⁴ At the peak of the crisis, Montefiore's healthcare system created a surge plan as the pandemic escalated. Drug demand for antivirals, opioids, sedatives, paralytics, vasopressors, and electrolyte modifiers for acute renal failure skyrocketed. Available supply diminished, inventory was erratic, safe and effective utilization knowledge gaps were amplified, and acquisition processes for medications non-approved by the U.S. Food and Drug Agency (FDA) commenced.

Clinical pharmacists:

- Increased rounding capacity at the front line to ensure optimal delivery of critical care
- Created high-level utilization reports to monitor usage of key drugs
- Produced algorithms for therapy areas without critical care specialized practitioners
- Educated their peers to support the needs of patients in the emerging critical care environments
- Created alternative protocols as backup plans for emergent shortages
- Requested build screens for non-formulary medications within the electronic medical record with smart-pump advisories to help inform nursing staff

Our pharmacy teams constantly communicated to stay abreast of the emerging data, expert recommendations, and safety issues; to provide emotional support for the demanding patient load; and to prevent burnout. In true multidisciplinary fashion, they met with pharmacy informatics and operations, nursing, and medicine subspecialties regularly to ensure that dosage, drug interactions, pharmacokinetics and evidence-based safety concerns were addressed.

How Additional Clinical Pharmacists Can Improve Surge Response

Research has shown that ICU pharmacists decrease length of stay, morbidity, mortality, and costs of care.⁵ Offering a clinical pharmacist for multidisciplinary rounds in surge units allows for greater improvements in sedation and analgesia monitoring targets, ventilator duration, and ICU length

of stay.⁶ Additionally, optimizing sedation affords better ventilator compliance without the use of neuromuscular blocking agents, the inventory of which was depleted during our surge. Without critical care clinical pharmacists reviewing medication profiles regularly, opportunities for drug underuse, overuse, and misuse may have been heightened, causing many of the fundamental aspects of critical care medicine to be overlooked.

Additional critical care trained pharmacists could improve a surge response through:

- More real-time discussion of dosage errors or adjustments for organ dysfunction and presentation of drug interaction information⁷
- Better standardization of non-FDA-approved drug practices, including investigational drug use and off-label drug-use, as well as the ability to more fully address the risk-benefit balances of off-label indications for FDA-approved medications with limited safety and efficacy data
- Performance of universally appropriate pharmacovigilance—the collection, detection, assessment, monitoring, and prevention of adverse effects with pharmaceutical products
- More support for emergency investigational new drug applications for compassionate use and expanded access programs

Despite utilization reports with surge projections created by clinical pharmacists, greater vigilance in surge areas can mitigate drug shortages. Literature reports confirm that pharmacists trained in appropriate pain, agitation, and delirium management allow decreased use of continuous sedatives.⁸ With knowledge and practical experience in optimizing dosing according to validated sedation tools, these pharmacists could have monitored more patients and advise healthcare professionals who are unfamiliar with proper adjustment strategies.

The pandemic created an unprecedented catastrophe in many health systems in New York City, and critical care providers were called to the forefront of managing the disaster along with clinical pharmacists. These pharmacists provided behind-the-scenes support as well as frontline patient care. Every ICU should have clinical pharmacy services, whether fundamental, desirable, or optimal. For this reason, the Society of Critical Care Medicine (SCCM) supports staffing models built with clinical pharmacists specialized in managing ventilation needs, at the direct patient care level.⁹ With clinical pharmacists integrated more heavily into hospital systems across the nation, it is very possible that we will see improvements in mortality. When credentialed critical care physicians are not available to manage all critically ill patients directly, it is essential to have clinical pharmacy services, especially in a pandemic.



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Nicholas Quinn, PharmD, is clinical pharmacy manager for critical care at Montefiore Medical Center, Moses Division.



Jen-Ting T. Chen, MD, MS, is associate director of the medical ICU at Montefiore Medical Center, Moses Division.

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SCCM Members Share Personal Stories from the Front Lines of the COVID-19 Response

BRINGING CALMNESS TO COVID-19 PATIENTS

Sherif Afifi, MD, FCCS; Chicago, Illinois, USA

There is a calming presence about Sherif Afifi, MD, FCCM, even if he looks like an astronaut. His face is covered by a hood and N95 mask. His voice is muffled. The powered air-purifying respirator he wears hums, and the air flow puffs out his gown, making him look inflated. You would think he was preparing for a space launch rather than an intubation.

Dr. Afifi is a physician and professor of anesthesiology and surgery at Northwestern Medicine. Since the onset of the COVID-19 pandemic, healthcare professionals around the world have had to take added precautions to protect themselves from the virus. The need for personal protective equipment (PPE) for frontline workers was well documented early in the pandemic, especially for an anesthesiologist such as Dr. Afifi, who performs aerosol-generating procedures while inches away from a patient's face.

Dr. Afifi knows that the layers of PPE are designed to keep him safe, but he quickly realized they can be jarring for COVID-19 patients who are battling not only the effects of their illness but also loneliness and fear. These patients are isolated from their family and friends—who are not allowed to enter the hospital—and left to think about whether they will ever see them again.

He also noticed that, when other healthcare workers were in the room, they mostly avoided sitting and stood apart from one another to avoid contact with surfaces. “Everyone caring for these patients is literally ‘looking down’ on them,” Dr. Afifi said. “Their contact with healthcare workers has been largely faceless, behind face masks and plastic gowns and gloves.”

With this in mind, Dr. Afifi made it his mission to bring a humanitarian approach to his patient care. When he enters a patient’s room for the first time, he knows that the patient has been told that his/her respiratory condition has worsened and that the patient will need to be started on a ventilator to mechanically support breathing, so Dr. Afifi’s arrival is not necessarily a welcome sight.

“The look in the patients’ eyes often gives me several immediate impressions,” he said. “First of all, they know they are sick. They are a statistic in a fast-moving pandemic that altered the world they were living in. Additionally, the next phase of intubation and mechanical ventilation is an unknown.” So he works to comfort them. He introduces himself, as well as everyone else in the room. He uses nontechnical terminology to describe what procedure will be done and why it is necessary. He reassures them that they will be given medications to keep them asleep and comfortable. Then he pauses. He keeps his eyes locked on the patient’s, building a connection while allowing the patient time to think through any questions he/she may have.

Most patients are apprehensive and often scared of what is to come. Recognizing this, Dr. Afifi continues to look at the patient as he asks the patient to follow his pointer finger. He points at the other people in the room and says they are there to make the procedure run smoothly. He points to the other caregivers in the ICU and asks for the patient’s room door to be opened. “I say that, in addition to us here in the room, there are all these people out there who are monitoring everything that happens to you, including your breathing, your heart rate and rhythm, your blood pressure, your lab work, your x-rays, the opinions of specialists, and a final consensus on the best course of management.” Then he finds his patient’s eyes again and clearly states four words. “You are not alone.”

“This last statement I have learned to add to my repertoire in taking care of the COVID-19 patients in isolation,” he said, “because they have had no visitors to the hospital and sparse contact with their family members and friends since they were admitted to the hospital.” It is a simple gesture but one that can have a profound impact on patients.

Dr. Afifi still remembers a brief encounter with a man in his 40s who needed a ventilator after testing positive for COVID-19. Dr. Afifi introduced himself and explained why he was there. The patient responded with a series of questions, one right after the other: Why does he breathe rapidly like he just ran the hundred-yard dash after being turned on his side? How long will he be sedated? What comes after being intubated? Will he be aware of time? How will his family be updated?

“I could immediately sense that he had an attitude of acceptance,” Dr. Afifi said, “but he also had been thinking about all these issues from the moment he was told that his breathing was not going to be sustainable on his own without mechanical assistance.” Dr. Afifi answered the questions as methodically as they were asked and provided the few statistics he had read during his feverish literature review. When he was uncertain about an answer, he reiterated how many people would be meticulously observing the patient’s condition. He then pointed to everyone on the care team. The patient’s ICU physician gave a thumbs-up, and the rest



“You are not alone. This last statement I have learned to add to my repertoire in taking care of the COVID-19 patients in isolation, because they have had no visitors to the hospital...”

— Sherif Afifi, MD, FCCM

of the team followed suit. The patient, an athletically built man, was brought to tears. Dr. Afifi patted him on the shoulder and began the necessary preparations.

“My prompt start of the procedure after that scenario was as important for me as it was for him,” Dr. Afifi said. “After 24 years of practice, I’ve recognized it has been my defensive veneer that I adopted to avoid personal and emotional involvement with my patients. That veneer works most of the time, but it has occasional failures. This was one of those times. At the end of my shift, I remembered a few small details that I had picked up while I was in that patient’s room. The picture of small kids on his iPhone screensaver. The two lonely get-well cards that were taped to one wall by his caring nurses. Even though I was only functioning as a technical consultant and stayed in his room for a total of 30 minutes, I felt drained.”

When he gets exhausted, Dr. Afifi thinks of the time when it was he who was nearly overcome with emotions. One day early in the pandemic, he found a poster displayed prominently in his front yard. Designed by kids in his neighborhood, they offered messages of hope and, most importantly, of thanks. “Thank you neighbor. Stay safe, stay healthy, find peace,” reads one. Another, adorned on a red heart, simply states, “Thank you Dr. Afifi for being a hero.”

He took a picture of the poster and brought it to the hospital, where he shared it with nurses in the ICU and recovery rooms. “I told them I’m sharing this with you because I’m not the only one who this poster is for,” he said. “It’s for anyone who works in a hospital. They were all really touched that people appreciate what’s going on.”



SEEING THE LIGHT THROUGH THE DARKNESS

Hesham A. Hassaballa, MD, FCCP, FAASM; Chicago, Illinois, USA

It was a very busy Saturday in the ICU. Patients with COVID-19 kept arriving—including many members of one family—and we were filling up quickly. We were all working tirelessly to prevent patients from having to go on mechanical ventilation, knowing that once patients go on a ventilator, their chances of coming off of it are not great. When I was finally able to go home, my rest was fleeting. I was called back to the hospital to place a central venous catheter for a patient being placed on a ventilator.

Back at home again, I received a call from my team about another patient who had suddenly become severely short of breath with plummeting oxygen saturation. Sedation and noninvasive mechanical ventilation trials did not work. I directed them to call the anesthesia department to intubate the patient. It was 4:45 a.m., and I couldn't sleep. I headed to the hospital early to start planning the next steps for a new patient, a woman in her 60s. Upon my arrival to the hospital, I met one of her ICU nurses.

"She died," the nurse said.

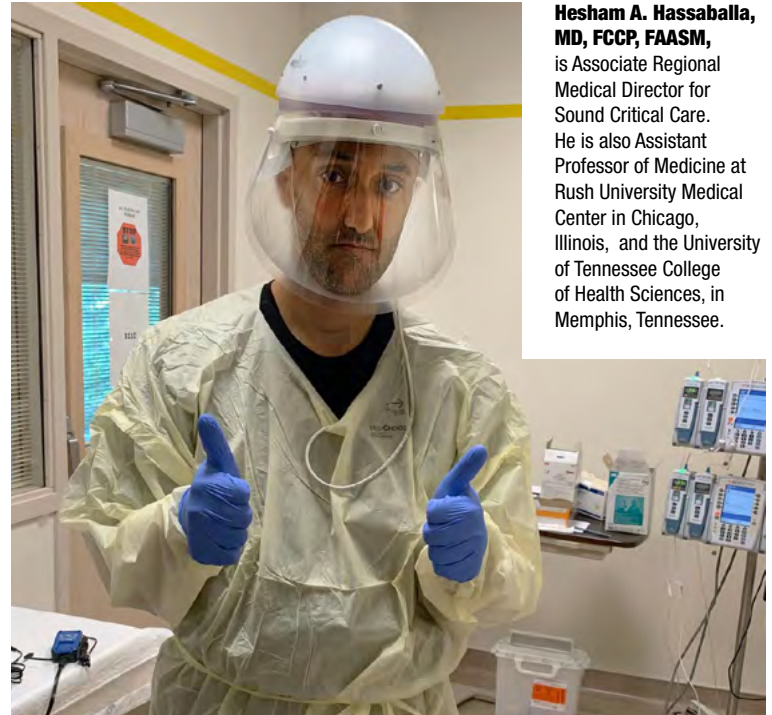
"What???" I said in complete incredulity.

"She coded at 5:20. We couldn't resuscitate her," she continued.

I couldn't believe it. I had not been worried about her condition. In fact, I was optimistic she was going to recover. Her nurse and respiratory therapist were devastated. We all debriefed the situation and went through in detail what had happened to lead to her unexpected cardiac arrest.

"You did nothing wrong," I told them. They were in tears, and I was fighting back tears myself. This was not the first patient we had lost to COVID-19, but the suddenness of it was devastating. Calling her daughter to inform her of the news made it hurt all over again.

The emotional toll of taking care of COVID-19 patients is substantial. These patients get frighteningly sick, frighteningly quickly. And they stay sick for a long time, sometimes having multiple complications. On top of this, there is the very real fear that we will get sick with this horrific infectious disease. Or worse, that we may bring it home to our families



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and get them sick. This is a constant menace, and it does not go away.

Yet, in the midst of that darkness, there is light. One of our patients who required mechanical ventilation and was quite sick was leaving the hospital. I didn't think he was going to make it. But, when he did, staff lined up at the front entrance of the hospital as he walked out to our enthusiastic cheers and applause. It was such a wonderful moment.

It is success stories such as this that give us the will to keep going in the darkness of this COVID-19 pandemic. While there will be loss—tough loss—there will also be success. We continue to work as hard as we can to help more patients walk out of the hospital rather than be wheeled out in a casket. This is why we are in the ICU, and it is a privilege beyond what words can describe.

TIMELINE SCCM'S COVID-19 RESPONSE

January 20: The head of a Chinese government team says human-to-human transmission has been confirmed in an outbreak of a novel coronavirus, a development that raises the possibility that it could spread more quickly and widely.

January 21: SCCM President Heatherlee Bailey, MD, FCCM, activates the SCCM Emergency Response System and sends a message to SCCM members to inform them of this development. A special message is also sent to members in China, expressing SCCM's gratitude for their work and sacrifice.

February 12: As the 49th Critical Care Congress gets underway, SCCM informs members in China that, because they must cancel attendance, they will receive free access to Congress On Demand.

February 11: National Public Radio approaches SCCM seeking subject matter experts on COVID-19, and SCCM Council Member Laura Evans, MD, FCCM, is featured on *All Things Considered*, reaching more than 14 million listeners.

Dr. Bailey sends a message to the critical care community alerting them to new resources from the CDC and from SCCM, including a new article from SCCM member Lewis Rubinson, MD, PhD, with information on how to prepare for an outbreak and keep safe.

February 17: SCCM adds late-breaking COVID-19 sessions to its Congress program, including a first-person narrative from Zhiyong Peng, MD, PhD, who reports from China. Ryan C. Maves, MD, and Laura Evans, MD, MS, FCCM, discuss preparation strategies, and a Spanish language session is presented.

HOW SURVIVING COVID-19 HELPED BRING MY COLLEAGUES AND ME TOGETHER

Sapna R. Kudchadkar, MD, PhD; Baltimore, Maryland, USA

It was April 13, 2020, and Sapna R. Kudchadkar, MD, PhD, could not tell if she was more nervous or exhilarated. It was a Monday, the start of a new week, but for Dr. Kudchadkar, it was the start of a new reality.

Dr. Kudchadkar is the associate vice chair for research in anesthesiology and critical care medicine at Johns Hopkins University School of Medicine and an attending physician in both the pediatric intensive care unit (PICU) and the operating room at Johns Hopkins Hospital. On that Monday, though, she had a new role and a new title as she joined colleagues from across the hospital to work in the adult COVID-19 ICU step-down unit. Her new title? COVID-19 survivor.

The return to work was a welcome change for Dr. Kudchadkar, who had just completed a two-week self-quarantine in her bedroom, away from her family, friends, and coworkers. “Those 14 days of isolation were hard because I felt helpless, knowing my colleagues were on the front lines and I wasn’t contributing,” Dr. Kudchadkar said. “So, even though it was a new setting, it felt like I was home.”

Dr. Kudchadkar was not exactly sure what to expect on her return. She was worried that her colleagues would be nervous being around her, and she was not sure what the adjustment from the PICU to the adult ICU step-down unit would be like. Fortunately, it was far easier than she expected. As she discovered, many of the principles of ICU care are the same, no matter the patient’s age, from optimizing communication and minimizing risk factors for delirium to promoting good sleep hygiene and good nutrition.

The transition was aided by the fact that she was not the only one new to the adult ICU step-down unit or to dealing with COVID-19. “What made it even easier is the fact that almost everyone was starting from a shared foundation,” Dr. Kudchadkar said. “COVID-19 is new



“It’s devastating to watch people die from a disease that you were blessed to escape with only mild symptoms.”

— Sapna R. Kudchadkar, MD, PhD

Week of March 3: SCCM organizes an internal COVID-19 response team and announces travel restrictions for staff and members of the Creative Community. The FDM Committee curates resources for free access and starts to develop new checklists and resources specific to COVID-19.



SCCM releases the first of two rapid-cycle surveys to better understand the needs and concerns of those on the front lines.

March 11: SCCM distributes the ICU Preparedness Checklist and the ebook, *Preparing Your ICU*, and launches the online education program, Critical Care for the Non-ICU Professional.

March 13: The report, “United States Resource Availability for COVID-19” is published online and announced in a press release. Lead author Neil A. Halpern, MD, MCCM, using previously unpublished critical care statistics, puts the pandemic into context with vital insight into the shortage of ventilators and healthcare staff.

March 18: SCCM President Lewis Kaplan, MD, FACS, FCCP, FCCM, briefs President Donald Trump, Vice President Mike Pence, and the Coronavirus Task Force on the state of COVID-19 patient care.

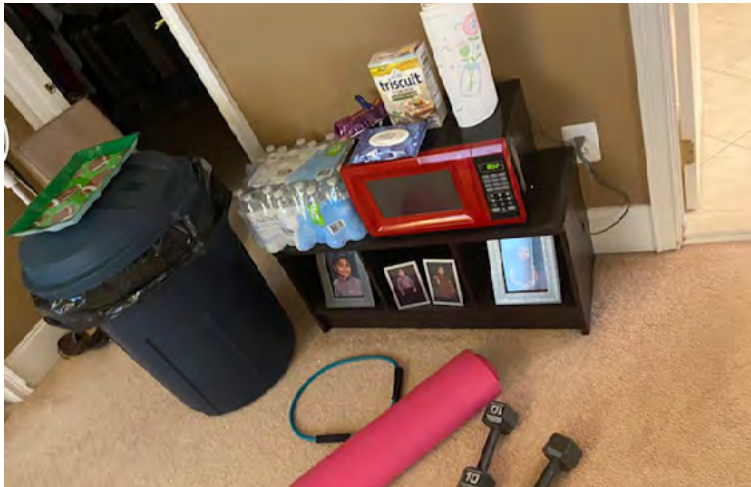
SCCM releases Critical Care for the Non-ICU Clinicians, a program preparing healthcare professionals who may be deployed to over-run hospitals and ICUs. Thousands immediately take advantage of the free training. In the first week, more than 127,000 sought training on the fundamentals of patient assessment, airway management, mechanical ventilation, and other critical care skills.

Clinical Spotlight: COVID-19

to everyone, and many teams had been assembled from multiple disciplines. So we all learned from each other and continue to do so.”

The first team she worked with in the adult ICU step-down unit included a senior surgical resident, a cardiac nurse practitioner, and a transplant nurse practitioner. “We all have an extraordinary amount to learn from each other,” she said. “If there is one positive about COVID-19, it really broke down so many silos across the hospital system.” Dr. Kudchadkar’s personal experience with COVID-19 also impacted how she supports her patients. One of the biggest obstacles she faced with her own condition was the isolation. She was diagnosed with COVID-19 on March 22, and she secluded herself in her bedroom, only talking with and seeing her husband and children by phone instead of face to face.

The seclusion, though, was draining. Dr. Kudchadkar, who is the social media editor for *Pediatric Critical Care Medicine* and *Critical Care Explorations*, chronicled her experience on Twitter using the hashtag #SapnasCOVIDdiary. On day 8 of her self-quarantine, she tweeted about how being isolated from loved ones can take a toll. “#IsolationLife starting to get to me, despite what I thought no amount of FaceTime, Zoom, or Words with Friends can replace in person human contact.”



Dr. Kudchadkar said she remembers those feelings as she works with COVID-19 patients today. Being a patient in the ICU before the pandemic was already a stressful experience. Now, with strict restrictions on visitors, patients are further removed from their support system. This is why Dr. Kudchadkar makes it a point to ask them about their family members or their favorite things or what television shows they enjoy. She is looking to build a bond with her patients.

“I am extremely conscious of the importance of human touch,” she said. “Even more than before, I do everything I possibly can to ensure our patients don’t lose that human connection.” Part of that desire for connection, she confessed, is built off her own survivor’s guilt. “It’s devastating to watch people die from a disease that you were blessed to escape with only mild symptoms,” Dr. Kudchadkar said. “Why me? Why was I so lucky, and these patients, some the same age and previously healthy like me, losing their lives?”

Before the pandemic, Dr. Kudchadkar’s primary research passion was the role of acute rehabilitation and mobility on outcomes in critically ill patients. Now, more than ever, she understands the importance of this topic. “COVID-19 has put a huge spotlight on the importance of this issue and the importance of optimizing survivorship as a guiding force in our day-to-day ICU care,” she said. “The SCCM ICU Liberation Bundle has never been more important, given the prolonged duration of mechanical ventilation and high risk of delirium in these COVID-19 patients. Integrating physical, occupational therapy, and speech language pathology and psychiatrists early in the hospital course is fundamentally important in the battle to prevent ICU-acquired weakness and to improve long-term outcomes.”

Dr. Kudchadkar said that her experience—and specifically her decision to capture her story on Twitter—also demonstrated how much a person can impact others, even beyond her own research or clinical work. “I have utilized my connectivity on social media to connect and collaborate far beyond my day-to-day circle to share my experiences as a patient, clinician, researcher, and now research subject,” she said. “I feel like I have a new perspective that is only augmenting my effectiveness as a clinician, both in the operating room and ICU.”

TIMELINE SCCM'S COVID-19 RESPONSE

March 20: Surviving Sepsis Campaign: Guidelines on the Management of Critically Ill Adults with COVID-19 is released. More than 17,000 downloads of the rapid-cycle guidelines occur in the first week.

Surviving Sepsis Campaign

SCCM provides education on the COVID-19 response with the webcast, “Scaled Pandemic Preparedness: From Large Medical Center to Community Hospital – What Do You Need To Do?” Meanwhile, the SCCM Chinese office holds a panel discussion with leaders from SCCM and the Chinese Society of Critical Care Medicine, reaching capacity with more than 9,500 attendees.

March 20: SCCM’s website hits an all-time record of nearly 66,000 visitors

March 26: SCCM publishes a collection of resources on mechanical ventilation strategies after working with the American Society of Anesthesiologists (ASA) and several other organizations. These resources offer guidance on how to augment ventilator supply in an emergency and what to do when options are exhausted. The collection includes a paper from FEMA’s COVID-19 Co-Ventilation Task Force, for which Dr. Kaplan is a member.

March 27: The first webcast of a new series is held to collect questions from the field and provide real-time answers from experts. More than 500 attend, and the series goes on to educate more than 110,000.

The COVID-19 Discussion Group is launched to create a network for clinicians to share information and pose questions. The group goes on to receive more than 10,000 visitors, including thousands reviewing early discussions of anticoagulation and corticosteroids.

PROVIDING PPE TO FRONTLINE WORKERS

Tricia Rae Pendergrast, BA; Chicago, Illinois, USA

With the rise of COVID-19, Tricia Rae Pendergrast, BA, knew she wanted to help. As a first-year medical student at Northwestern University's Feinberg School of Medicine, she helped launch Students Supporting the Community During COVID-19, which offered a wide range of assistance, from grocery shopping for the elderly to tutoring children online. Ms. Pendergrast and her classmates thought about how they could help teachers, mentors, and residents at Northwestern Memorial Hospital, so one sector of the group was designed to focus on collecting N95 masks to provide to frontline healthcare workers.

It was then that Ms. Pendergrast realized that many medical workers did not have sufficient personal protective equipment (PPE). "It became abundantly clear that Northwestern was actually much better off than many of our community hospitals, organizations, and neighbors," Ms. Pendergrast said. "It became an equity issue, and serving only our institution would not be the right thing to do." She discovered that several other medical schools in the area were trying to collect vital equipment for medical workers, so the organizers of each school came together to discuss their goals and determine whether partnering together could have a larger impact. With that, GetMePPE Chicago was born.

Medical students from Northwestern, University of Illinois at Chicago, Loyola University, Rush University, and Rosalind Franklin University launched GetMePPE Chicago on March 20, 2020, in an effort to help protect the people working to protect Chicago against COVID-19. Within six weeks, the group collected and distributed more than 100,000 units of medical equipment throughout Chicago, including N95 and KN95 respirators, face masks, face shields, and gloves.

"Because we combined our efforts early on, we were able to get this comprehensive overview of what needs there really were in Chicago," said Ms. Pendergrast, "as opposed to staying in the silos of our own home institutions." This analysis of needs across the city not only



Photo: Northwestern University

flagged who was in the most need of PPE but also highlighted what Ms. Pendergrast called "the history of segregation that has defined how our city invests in its people."

The data surrounding the racial disparities of Chicago residents who contracted COVID-19 as well as those who died from it are well reported and have garnered national attention. Seventy of the first 100 COVID-19-related deaths in Chicago were black, and data from early April showed blacks dying from COVID-19 at a rate six times that of white Chicagoans.

Ms. Pendergrast explained that, as she and the rest of the GetMePPE Chicago leadership team determine allocation of PPE, part of the decision comes down to racial inequities. "Who are we helping when we bring these masks to nursing homes?" she asked. "Yes, we're protecting residents, but we're also protecting black and Hispanic workers who work for minimum wage, people who before the coronavirus had trouble accessing healthcare or paying for food."

Initially, GetMePPE Chicago had about 500 medical students from the five universities working together to canvas the city for PPE and

April 1: Results from the first of a series of rapid-cycle surveys spearheaded by SCCM are released. Two-thirds of respondents report that their facilities are not well-prepared for COVID-19. Concerns range from shortages of supplies and staff to a lack of personal protective equipment.

April 13: SCCM issues a call for volunteers on behalf of New York. Calls for volunteers in New Jersey and Illinois follow. SCCM processes more than 240 volunteer applications within 48 hours before it turns over the application processing to the state governments.

April 17: Dr. Kaplan conveys a message to the membership with major updates on the SCCM response effort and available resources.

April 10: Continuing to work with local governments to enlist volunteers, SCCM announces numerous partner discount programs to help make life easier for those on the front lines. Among the benefits is a partnership with Hilton Hotels to offer free rooms for SCCM members. Days later, an SCCM member, who had been self-isolating in her car to protect her immunocompromised roommate, writes a letter of thanks to SCCM and the hotel chain.

April 15: SCCM's COVID-19 Rapid Resource Center is launched as a trusted source for peer-reviewed, vetted critical care-specific education.

April 20: The Washington Post publishes an editorial from Dr. Kaplan on the need for a national hospital data dashboard.

Clinical Spotlight: COVID-19

determining who within the city needed the equipment most. The students thought about the industries that use PPE—contractors, auto repair shops, furniture restoration stores—and then spent hours calling businesses to see if they had any extra PPE available.

Today, the group relies on approximately 30 volunteers to pick up donations and deliver PPE to those who need it most. Donations have come in all shapes and sizes, from bKL Architecture, which allowed a few of its employees to go into their closed office to print face shields on a 3D printer, to the man who found five N95 masks in his basement, to the woman who provided an old box of gloves.

“No act of advocacy or volunteerism or donation is too small,” Ms. Pendergrast said. The GetMePPE Chicago team has also orchestrated the distribution of more than 70,000 units of PPE on behalf of #GetUsPPE and more than 50,000 face shields on behalf of Boston Scientific. “Not only are we raising money, reclaiming, making, and purchasing our own PPE for the community, but we’re also being trusted by large organizations to handle their logistics on the ground,” Ms. Pendergrast said. “We’re able to really make good decisions for our community because of how much we know and care about it.”

Despite the positive impact she is making, Ms. Pendergrast scoffs at being called a hero, particularly as thousands of dollars are spent on acts of gratitude such as flyovers by the Blue Angels and Thunderbirds. “There is all this grandstanding and not enough people taking action to get really baseline protections,” she said. “Unless they’re dropping N95s out of the sky, save that money and use it to make people safe.”

Ms. Pendergrast confessed that she would love to return to life as a full-time student, but she and her fellow team members will continue collecting PPE and distributing it across Chicago until they are no longer needed. It has been a learning experience, one that she hopes others can learn from as well. “Initially, I felt overwhelming guilt for not doing more than just helping my community,” she said. “I saw what was going on in New York City and Detroit and Washington, and I felt guilty only focusing on Chicago, but we’ve made a pretty significant impact here. I realized it’s okay to focus on your community and want to keep the people around you safe.”

SLEEPING IN MY TRUCK TO KEEP PEOPLE SAFE

Kimmy Siebens, RN; Seattle, Washington, USA

The 2003 Toyota Tacoma sat in Seattle’s Harborview Medical Center parking garage, the windows of its green canopy blacked out by duct tape and poster board from the local dollar store. Inside lay a twin-sized air mattress, a sleeping bag, and a cell phone charger. For two weeks in April, this was home for Kimmy Siebens, RN.

Ms. Siebens is a critical care nurse at Harborview, Washington State’s only level 1 trauma center, where she has worked for the past 12 years. She lives with her boyfriend in Bremerton, more than an hour away from Harborview. The combination of odd working hours and long commute led her to rent a room in Seattle where she stayed on the nights she worked.

Before the COVID-19 pandemic, she worked 12-hour night shifts in the trauma surgical ICU, but with the onslaught of COVID-19, she volunteered to work in the hospital’s COVID-19 ICU instead. Typically, when she left Bremerton to go to work, she took an hour-long ferry ride to Seattle, but as the pandemic progressed, that no longer became an option. The number of available ferries was reduced during the day, so suddenly Ms. Siebens faced an even longer commute. But that was not her biggest problem. The largest challenge she faced was the uncertainty that persisted amid the pandemic.

“When more and more was being found out about the coronavirus, I started to worry about my roommates in Seattle and my boyfriend, who were all staying home,” Ms. Siebens said. “I felt like I would be their main risk factor for getting the virus. Even after showering and changing scrubs and shoes after work, there seem to be so many unknowns about how contagious this really is and why some people are getting sicker than others. Some of my roommates have underlying health conditions, and I felt that sleeping in my truck wasn’t nearly as bad as one of them getting sick and perhaps dying because of me.”

Ms. Siebens grew up camping, so she figured sleeping in the bed of her truck would not be much different. Once her shift ended at 7:00

TIMELINE SCCM’S COVID-19 RESPONSE

April 23: Partnering with Direct Relief, SCCM helps donate ICU kits to hospitals in New York and South Dakota. South Dakota was a hotspot due to outbreaks at several meat-packing plants. The kits include more than 86,000 units of essential pharmaceuticals, the hospitals also receive more than 100 oxygen concentrators.

April 24: After joining with the American College of Chest Physicians to reconstitute the Task Force for Mass Critical Care, SCCM endorses a new implementation guide that addresses regional resource allocation. SCCM also releases its own Crisis Standard of Care Recommendations for Triage Critical Resources During the COVID-19 Pandemic.

April 21: Authors of the Surviving Sepsis Campaign guidelines and leaders from SCCM are invited by Dr. Anthony Fauci to collaborate on a COVID-19 guideline from the National Institutes of Health.



Craig M. Coopersmith, MD, MCCM, FACS



Amy L. Dzierba, PharmD, FCCP, BCCCP, FCCM



Laura E. Evans, MD, MS, FCCM



Mitchell M. Levy, MD, MCCM



Greg S. Martin, MD, FCCM



a.m., she would shower and eat at the hospital, then go to her truck, charge her phone, and sleep for four or five hours. That cycle repeated itself for two weeks. While not the ideal living arrangement, Ms. Siebens considered herself fortunate. Two years earlier, she had founded the Bremerton Homeless Community Coalition with the goal of educating the community about homelessness and encouraging community service. Lying in her truck, her connection to the homeless community strengthened.



She said, “During this time of uncertainty, I have never felt closer to what a homeless person may experience, unsure of where I can sleep or even use the bathroom and not get in trouble.” As the second week of truck living ended, Ms. Siebens received a video of a news broadcast from her boyfriend. The story discussed Hilton partnering with American Express to offer one million nights of hotel stays for frontline healthcare workers, including Society of Critical Care Medicine (SCCM) members. Intrigued, Ms. Siebens connected with Ann Vandehey, director of sales and marketing at Hilton Seattle. Ms.

Vandehey told Ms. Siebens that the program did not start for another week but invited her to stay at the hotel as Ms. Vandehey’s guest until the promotion began.

The first night in the hotel was an experience Ms. Siebens said she will not soon forget. “It was so much better than my truck,” she said. “It was nice to have a very comfortable bed and pillows. My back was not enjoying the truck much. It was also fun to watch a movie on TV and think about something else for a while.” She has a room secured at the hotel for her work nights through the end of May thanks to the Hilton-SCCM partnership. When she is not working, she is back in Bremerton, where she temporarily lives in a small camper with her two dogs.

Ms. Siebens has also continued her work with the Bremerton Homeless Community Coalition. She was able to secure donations of surgical masks for the two local homeless shelters, as well as a new third shelter. She also raised funds for more relief beds and foam floor mats that can be easily cleaned so homeless babies and children have a safer place to live.

She is currently collecting donations for a COVID-19 homeless shelter in Seattle where those with mild symptoms and without a home can stay while they recover. “We have collected items such as small handheld games and coloring books to help keep people from going too stir-crazy,” she said. “Also, we have been collecting clothing and underwear and tents so we can help them when they leave the shelter.”

Ms. Siebens is thankful for all who have supported the homeless community, just as she is grateful for those who continue to help her out. She sees the posters in people’s windows thanking frontline workers like herself, and the offers from restaurants providing free food to medical workers are incredibly generous, she said. The praise is not why she became a nurse, but it certainly is appreciated. “We don’t do what we do for the recognition,” Ms. Siebens said. “People wouldn’t last if that’s all they cared about. I think the public learning more about what we do is always a good thing, though. Our main goal is to keep them safe, and if they like us while we are doing that, it’s great!”

April 30: SCCM President Elect Greg Martin, MD, MSc, FCCM, is among those tapped to lead a national effort to supercharge the innovation, development, and commercialization of COVID-19 testing as part of the NIH Rapid Acceleration of Diagnostics (RADx) Initiative. Its goal is to make millions of accurate and easy-to-use tests available by fall 2020.

May 7: Spanish and Japanese materials are added to the Critical Care for the Non-ICU Clinician training.

June 1: SCCM announces that its in-person meetings, including the Critical Care Congress, will be reformatted to meet the needs of critical care professionals in the era of COVID-19. Abstract submission opens as planned.

Registration is opening soon. Visit sccm.org/congress2021 to be notified when registration opens.

May 4: SCCM member Gregory Margolin, DO, FCCP, FCCM, who has been sharing with the Society his daily video diaries chronicling his experience as a volunteer in New York, is featured on the TODAY show. With nearly 5 million viewers, this high-profile, public recognition of critical care professionals kicks off National Critical Care Awareness and Recognition Month.

May 8: SCCM officially launches the Discovery VIRUS COVID-19 Registry, a joint project with the Mayo Clinic with funding from the Betty and Gordon Moore Foundation. The registry had been operating for weeks in advance of the official announcement. The project came together in record time after SCCM connected key experts via social media. The registry currently has more than 500 participating sites.



How a Master of Critical Care Medicine Prepared for the Coronavirus Pandemic



Planning is part of the core DNA of the disaster/mass casualty community. Some of us have made it an academic focus.¹ Plan and prepare, simulate and train, in a continuous quest for quality improvement, sometimes on a large scale. We never know what might be coming, except that it is coming, so there is a need for foresight and imagination in the planning process.

Preparation has always been a personal focus. It was the subject of my 2005 presidential address to the Eastern Association for the Surgery of Trauma,² and my 2008 Society of Critical Care Medicine (SCCM) presidential address. In order to prepare and lead, whether your institution or your team, it is important to understand yourself: how you work, how you learn, how you teach, how you interact. Few people are instinctive natural leaders, but we can learn and become skilled. If leadership is not a role you hold or seek, you can prepare to be an engaged, valuable team member.

There are two aphorisms that I teach my trainees: “It is easier to keep a patient out of trouble than to get a patient out of trouble,” and “If you think two steps ahead, you can act one step ahead.” These principles have served me well throughout a long career as an acute care surgeon (trauma, emergency general surgery, surgical critical care), and in responding to three mass casualty incidents in New York City: September 11, Hurricane Sandy, and the U.S. epicenter of the novel coronavirus 2019 (COVID-19) pandemic. Each was unique, and all taught us much. This essay is about our response to the most recent, ongoing catastrophe.

Planning and preparation began in early March when the first few cases were presenting for hospital admission. We knew trouble was brewing and began planning for conversion of clinical spaces into temporary ICUs and for redeployment of staff, but nothing was concrete. In retrospect,

it is quaint to reflect on how little we knew about the disease just a few weeks ago—or what would be required of us. Imaginative planning, some of which had to happen on the fly, carried the day. In strategic planning parlance, *scenario planning* envisions the worst-case scenario, and then imagines it to be even worse than envisioned so as to plan accordingly.

Scenario planning came to the rescue of SCCM in 2005 in the aftermath of Hurricane Katrina, when I was on the SCCM Executive Committee and the Strategic Planning Committee. Our Critical Care Congress was scheduled only four months later and needed immediate relocation from the inundated Ernest N. Morial Convention Center in New Orleans. The catastrophic loss of our convention venue had been planned for in advance, and SCCM was able to relocate within hours to the George R. Moscone Center in San Francisco despite substantial competition from other displaced

organizations. Scenario planning would prove instrumental for pandemic response planning as well.

From zero cases of COVID-19 in New York State on March 4, there were more than 7100 cases by March 20, with nearly 2000 new cases each day. As of this writing (May 12, 2020), confirmed New York State cases number 338,485, with 1430 new cases today.³ Statewide, deaths number 21,845, with 205 new deaths. For New York City, the data are 186,123 total cases (55% of the state total), 766 new cases (54%), 20,237 deaths (93%), and 181 new deaths (83%). The exponential increases in cases and deaths underscore the enormity of what was asked of us, institutionally as well as personally.

By executive order of the governor of New York State, all hospitals were ordered to double the number of available adult intensive care beds, from 114 to more than 250 ICU beds total in our facility. In response, elective surgery ceased on March 14; operating rooms, postanesthesia care units (PACUs), and step-down units were transformed to function as temporary ICUs, and hundreds of noncritical care staff members were trained to collaborate with critical patient care. Authentic ICUs were charged with managing the sickest patients. Modifications (e.g., physical

Multiprofessional staff from the 8-South Surgical Intensive Care/Trauma Unit of NewYork-Presbyterian Hospital/Weill Cornell Medical Center during the COVID-19 pandemic, May 22, 2020.



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barriers, upgraded ventilation and electrical power) were required to convert operating rooms,⁴ PACUs, and medical-surgical floor units into temporary ICUs. Our sense was that we had little time to prepare;⁵ we were correct—we had about one week. One thing we did not expect, and could not plan for except in near-real time, was how often and how dramatically our service's mission would change in the space of a few days.

By March 23, the surgical ICU had been designated as the non-COVID-19 medical-surgical ICU for all comers. Our two virus-positive patients were transferred out, and we received numerous admissions from just about every other ICU as the other units began cohorting COVID-19 patients, who then numbered about 35. As we predicted at the time, that lasted only until the COVID-19-designated authentic ICUs, which were then basically all of them except the surgical ICU and adjacent burn unit, reached capacity. That took two days.

The flood of COVID-19 patients via the emergency department began on March 25, just as we had emptied our unit a second time into our burn unit, the then-current designated non-COVID-19 medical-surgical ICU. The burn unit census at the time was 11 patients, five of whom had burns. Only four of the 23 rooms in our main operating suite still functioned as operating rooms; the remainder had been transformed into a large (40+ bed) temporary ICU. Emergency general surgery had almost ceased because people were staying away from the hospital in droves for fear of contagion, and those who did present were managed nonoperatively insofar as possible (e.g., acute appendicitis and cholecystitis). Trauma volume plummeted as people stopped driving under stay-at-home orders and the bars closed. Noncritical, non-COVID-19 patients were moved across the street to our orthopedic specialty hospital. Pediatric patients were transferred to another children's hospital in our network. We were transformed into a several-hundred-bed adult respiratory intensive care hospital. In our latest role, we received 19 new, unstable, ventilated COVID-19-positive patients in less than 24 hours. One negative-pressure room was reserved momentarily for respiratory procedures such as intubations, bronchoscopy (avoidance was encouraged owing to potential aerosolization of viral particles) and tracheostomy (also to be avoided). That did not last long either, as admission number 20 was accepted within hours. That was one hectic day.

Our mission as surgical intensivists, once definitive, was manifold: to care for numerous critically ill patients while learning about the new and unique COVID-19 syndrome; to train, inculcate, and incorporate colleagues with limited or no critical care experience to provide care to these patients; and to revise existing protocols and create new ones to standardize critical care across multiple temporary ICUs as they opened to receive patients, and to which we (correctly) anticipated redeployment. Our task was confounded by the unstable, rapidly changing nature of these new patients; yet, given their remarkably similar presentations it could become difficult to keep track.

Moreover, arterial blood gas determinations often exceeded 100 tests/unit/day. This, combined with the need to follow a battery of other biomarkers that are of prognostic value in COVID-19 but otherwise ordered infrequently (e.g., procalcitonin, D-dimer), added to the density of data capture and the potential for confusion. It was necessary to fundamentally transform what and how we communicated. The need became apparent immediately for a simple system of patient classification that would be useful for triage, communication, and resource allocation (should it have become necessary; fortunately it did not).⁶ A visual tool, analogous to a dashboard, was also created to facilitate rapid, accurate transmittal of

crucial information, even to clinicians coming to the ICU bedside for the first time.⁷ After a 48-hour trial period, both innovations were adopted hospital-wide and remain in use as of this writing.

At the peak, which occurred about April 15, 10 temporary ICUs were caring for 211 critically ill ventilated patients with COVID-19 in addition to the authentic ICUs, with medical care provided by anesthesia, medical, pediatric, and surgical intensivists. (Across the network, peak workload was 733 ventilated patients.) To cover our service responsibilities, including 54 critical care beds in three ICUs (one was a temporary unit in an ambulatory surgery facility across the street), trauma, emergency general surgery, and burns, the surgical service redeployed with 12-hour shifts around the clock, five days on/two off. Each of our ICU teams had a surgical intensivist, an internal medicine hospitalist, a surgical critical care fellow, one physician assistant, and four residents, whether from anesthesiology, general surgery, neurosurgery, oral surgery, or plastic surgery. Three board-certified surgeons (two with surgical critical care certification) returned "home" from other institutions to serve as volunteers, providing invaluable coverage of the call schedule. Our chief of breast surgery, an individual experienced in talking with patients and families, volunteered to assume responsibility for daily communications with families (a crucial task considering that patient visitation was suspended), freeing up bandwidth for the intensivists to provide patient care. Several team members became ill themselves. The ranks of physical therapists and dialysis nurses were depleted by numerous cases of COVID-19; for them it was a scramble to provide coverage. Our clinical pharmacy manager, also out sick with COVID-19, performed yeoman service by making daily rounds by telephone. Heroes, one and all.

Now post-peak, even as we continue to care for these patients, the planning and preparation continue, to restore hospital services and resume business as usual. When will New York City reopen? We still have but four operating rooms functioning as such, but access to them is now becoming less restricted. Acute care surgical volumes are recovering as people overcome their fear of coming to the hospital. As of today, we can operate again on uncomplicated acute appendicitis or cholecystitis if indicated. Elective surgery is another story. Soon the operating rooms and the PACUs will be restored, and we will be ready. The backlog department-wide is hundreds of cases. Will we be enabled? That decision will be as much political as medical.

Criteria as to when New York City will normalize are heavily oriented toward medical indicators.³ New York State set seven criteria statewide, four of which are met currently in New York City. We have had a 14-day decline in hospitalizations and deaths. More than 30,000 tests/100,000 population have been performed in the past 30 days, and more than 30 contact tracers/100,000 population are working.

Criteria not met as yet are for new hospitalizations to be fewer than 2/day/100,000 (currently 2.67), the proportion of hospital beds available to be more than 30% (currently 28%), and proportion of ICU beds available to be more than 30% (currently 24%). Two of three additional New York City criteria have been met: Hospital admissions are fewer than 200/day, and the proportion of new, positive nasal swab tests is less than 15%, but there are still 550 critical care patients in the hospitals operated by the NYC Health + Hospitals Corporation, and the number needs to be less than 375. Close, but how close? Critically ill COVID-19 patients do not recover quickly. Until that day, we plan and prepare for the future and continue to look after the 24 critically ill COVID-19 patients still in our care.



PTSD and Burnout in Healthcare Professionals

The COVID-19 pandemic has disrupted many aspects of daily life around the world and has created tremendous challenges for healthcare professionals who are juggling the stress of work-related risks and critical decisions as well as personal concerns about infection. Over time, professional demands may shift from fact-finding and crisis management to more chronic issues of resource utilization and an increased baseline level of anxiety, adding to existing psychological demands and stressors in clinical critical care practice. The psychological toll of overworked healthcare professionals under these conditions and the greater risk of error that accompanies stress should make us even more cautious of the possibility of burnout and posttraumatic stress disorder (PTSD) affecting ourselves or our colleagues. This article addresses the most common signs and symptoms of burnout and PTSD and discusses the initial steps of recognition, prevention, and management.

In the medical literature, the prevalence of burnout among intensive care staff has ranged from 25% to 80%. PTSD has a prevalence of 18%-22%. It is estimated that 8%-10% of the general American population develop PTSD, making this the fourth most common psychiatric diagnosis. About 21% of ICU nurses surveyed co-presented with PTSD, and staff diagnosed with PTSD almost invariably experience burnout also.^{1,3}

Burnout is not an official psychiatric disorder, but during the past decade it has become acknowledged as a common psychological condition in healthcare professionals, distinct from major depression. Burnout is usually defined by the triad of exhaustion, depersonalization, and a reduced sense of personal accomplishment and efficacy. Burnout threatens an individual's ability to renew his/her energy and find effectiveness and a deep sense of meaning in work, core values for many healthcare professionals. Burnout can be assessed for research or clinical purposes by self-completing the Maslach Burnout Inventory - Human Services Survey (MBI-HSS).⁴

In contrast, PTSD is a formal psychiatric disorder, with Diagnostic and Statistical Manual of Mental Disorders (DSM-5) diagnostic criteria including recurrent, involuntary and intrusive daytime thoughts and

images, dreams and nightmares, distress, or memories related to the original trauma, with dissociated behaviors, negative mood, and avoidance of behaviors related to the original traumatic stimuli or situation. Once believed to be the result of wartime stressors or life-threatening events such as earthquakes or tornadoes, mental health professionals have documented the occurrence of PTSD as a not uncommon effect of any life-threatening occurrence. PTSD among healthcare professionals as a result of clinical stressors and events is a more recent finding.

Understanding PTSD and Burnout

Burnout and PTSD may co-occur or may occur independently of one another. Below are some ways to help identify either condition.

Either burnout or PTSD in a healthcare professional has significant and sometimes severe implications for that practitioner's personal and professional life and, by extension, for the medical field. These distressed mental states may have significant and deleterious impacts on the patients under their care. Studies have documented negative effects on patients whose care is compromised by healthcare professionals with burnout or PTSD, such as increased incidence of medical errors, increased infection rates, and decreased patient satisfaction scores.

The impact of burnout or PTSD for practitioners is obviously severe. Professionally, their career span may be shortened, they are less able to collaborate with peers, and their performance suffers. Modeling of negative behaviors for colleagues, trainees, and junior team members can affect team morale and resilience and further the spread of burnout. Burnout and PTSD can negatively impact healthcare professionals' personal lives, with studies documenting decreased ability to function,



Consequences of PTSD and burnout to the patient, medical team, and hospital:

- Decreased patient and family satisfaction
- Increased medical errors and infection rates among patients
- Damage to professional reputation as collaborations and partnership become more fraught
- Decreased morale among junior staff
- Difficulties maintaining meaningful professional and personal relationships

maintain meaningful relationships, sleep adequately, perform activities of daily living, and live safe lives. Economic costs of these disordered emotional states for healthcare organizations can include decreased performance, reduced payments, decreased productivity from affected healthcare professionals and others on their team, and increased costs from the resulting staff turnover. Healthcare professionals whose assessments reveal burnout or PTSD should be screened for other psychiatric conditions; both carry increased risks for coexisting major depression, other anxiety disorders, substance use, and of course suicide.⁵⁻⁷

The COVID-19 pandemic poses tremendous stress for critical care professionals. Settings that specialize in caring for vulnerable populations, such as Black and Latinx patients, elderly patients, lower-income patients, or those

with chronic health problems that predispose to poor outcomes, may see high rates of mortality in their patients. In New York City this spring, some ICUs saw mortality rates as high as 88% among intubated and ventilated patients with COVID-19. Some patients declined quickly, causing a sense of powerlessness and lack of efficacy among staff. When surveyed, healthcare professionals have expressed anxiety about the lack of personal protective equipment (PPE) and reliable laboratory testing, the fear of infection in themselves or being contagious to their families. These conditions are rife for the development of burnout and PTSD. A study from China showed high rates of depression, anxiety, insomnia, and distress among healthcare professionals during the COVID-19 outbreak there.⁸ The strain on critical care healthcare professionals can be expected to be worse than average in clinical settings.

For organizational leadership, identifying those at risk for burnout and PTSD remains a priority consistent with the responsibilities of institutions to their staff and to maintaining the highest quality of care for patients. Staff, along with wellness committee members and risk management personnel, should strive to engage their institutions to understand the prevalence and importance of these conditions. The effects of burnout, PTSD, and other psychological conditions are known to produce feelings of isolation in healthcare professionals. Even in times of high group distress, such as the current pandemic, staff may suffer in a profoundly private and subjective manner. Workplace performance may be the last domain affected, given the importance that our training places on patient care and professional responsibility.

Staff can create smaller support networks in which members feel safe to disclose their emotional reactions to events and provide support and encouragement to each other. Journaling and the practice of mindfulness, as well as other simple acts of self-care, may reduce the incidence of burnout and create healthier habits. Staff can borrow from the cognitive behavioral therapy literature, consciously avoiding negative thoughts and cultivating positive ones, such as finding things for which they are grateful. Staff can feel further empowered to practice and

Peer-to-Peer Mental Health Resources for Clinicians:

Magellan Healthcare, Inc.
MagellanHealthcare.com/COVID-19
+1 800 327-7451 (24/7)
Magellan Health, Inc., a behavioral health company, is operating a free 24-hour crisis line for all first responders and healthcare workers serving on the front lines of the pandemic. Callers will speak directly to a certified licensed mental health clinician.

Physician Support Line
physiciansupportline.com
+1 888 409-0141 (every day, 8:00 a.m. – 1:00 a.m. Eastern Time)
Staffed by more than 500 volunteer psychiatrists, Physician Support Line offers free and confidential support to physicians, fellows, residents, medical students, and others.

Other Support Services:

Disaster Distress Helpline
Substance Abuse and Mental Health Services Administration
+ 1 800-985-5990 or text TalkWithUs to 66746

National Suicide Prevention Lifeline
suicidepreventionlifeline.org/chat
+1 800-273-8255

Crisis Text Line
crisistextline.org
Text TALK to 741741

cultivate resilience in the face of adversity. It is important to note that staff often feel overburdened already; wellness in institutional life is also the purview and responsibility of organizations. Shaming or blaming practitioners for not practicing sufficient self-care is an unrealistic and unproductive exercise. Rather, workplace organizations are better served by focusing on the needs of their staff, providing visible leadership, providing a safe workplace, making sure that staff are listened to, and supporting them in a manner that is regarded as practically helpful and holistic.⁹

Examples include providing frequent informational updates, ensuring adequate PPE, coordinating donations from the community for free meals for staff, or assistance in coordinating child care or other services that are adversely affected by the pandemic. Multidisciplinary rounds can be coordinated by mental health professionals or chaplaincy and offer opportunities for attendees to share common concerns and vulnerabilities, often ending with practical steps or a brief mindfulness exercise. Organizations such as the Schwartz Center for Compassionate Healthcare have well-developed programs and support for hospitals and clinics to establish multidisciplinary rounds, including structured formats and training for facilitators. These avenues also present opportunities for leadership to actively listen and announce action plans based on group concerns, building and strengthening the resiliency and health of organizations during especially stressful times.^{8,10}

There is much that still needs to be studied, defined, and refined to better understand how critical care specialists are affected by the various factors that increase the risk for burnout and PTSD. Ideally, we would know more about the timeline and progression of burnout and PTSD in our field and the steps that should be taken to minimize both the potential development and the impact of these conditions on any practitioner. Future studies may clarify those at greatest risk, along with what factors make some individuals more resilient, and what we can learn about strengthening the ability of individuals and groups of healthcare professionals to cope effectively under periods of maximal stress.

Meanwhile, the urgency of the current COVID-19 pandemic as a global stressor poses an immediate threat that will severely increase the risk of negative health consequences among all healthcare professionals, including the development of burnout and PTSD. It is likely that critical care professionals will be shown to be especially impacted. We therefore advocate for education about these consequences, along with early awareness, vigilance, and a proactive approach toward mitigating and managing them.



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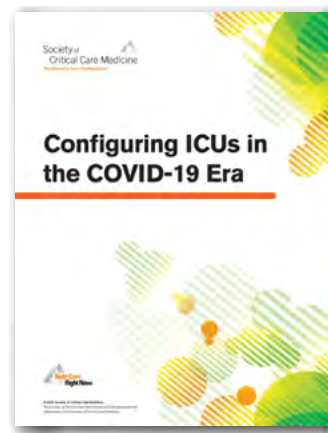
David Elkin, MD, MSL, is a clinical professor at the University of San Francisco, California; Department of Psychiatry co-coordinator for medical student education; and codirector of the Consultation Liaison Service at Zuckerberg San Francisco General Hospital.



Configuring the ICU in the COVID-19 Era

If there is one certainty during the COVID-19 pandemic, it is that this disease is like no other. The pandemic has overwhelmed intensive care units (ICUs), prompting the need to adjust to ensure the best possible care for critically ill patients while reducing the risk to healthcare workers. Because all of us are learning as we go and hungry for insights from other healthcare professionals and facilities that have been treating patients who are critically ill with COVID-19, SCCM has created the report *Configuring ICUs in the COVID-19 Era*.

The report draws on the experiences of critical care physicians, nurses, advanced practice providers, pharmacists, respiratory therapists, biomedical engineers, and environmental staff on the front lines. It reflects insights and improvisations regarding what has worked and lessons learned from a dozen medical centers throughout the country that have been treating significant numbers of COVID-19 patients, from New York City to Omaha, Cincinnati to Atlanta.



Download the Full Report

sccm.org/icuconfiguration

This report is a must-read for healthcare professionals augmenting hospital capacity and shifting approaches to care.

Specifically, it addresses rapidly creating and staffing new ICUs; developing new processes of care; rethinking the delivery of respiratory care, pharmacy, and medication management; and instilling new processes to protect staff from aerosolized virus contact.

The sections include:

Clinical Management Strategy

The report recommends that each hospital develop its own principles and protocols for COVID-19 patient care, starting with appointing a critical care leader who coordinates care via multidisciplinary workgroups that are in continual contact and meet regularly to address issues that continue to evolve, from anticoagulation to equipment management. This approach will help ICUs cut through the red tape to rapidly respond to clinician and patient needs.

Overarching Principles of COVID-19 ICU Management

Minimizing entry into ICU rooms is vital to decrease the risk of exposure to clinicians. The report provides examples of a variety of tasks that can shift from inside to outside the room.

Increasing ICU Capacity

Hospitals that have experienced a surge in COVID-19 patients have had to expand their ICU capacity because of the numbers of patients who need to be treated, as well as the often extended lengths of stay. The report provides suggestions for converting ICUs to COVID-19 ICUs, converting non-ICUs to COVID-19 ICUs, converting operating rooms to COVID-19 ICU rooms, and converting spaces without individual rooms and doors (e.g., postanesthesia care units or cafeterias) into ICUs. When possible, certain activities should be shifted outside the room, but a direct line of sight to the patient is vital, so in some cases this means installing windows in solid doors. This section also addresses the use of a tiered staffing strategy to expand capacity, following guidance described in SCCM's report United States Resource Availability for COVID-19.

Infusion Pumps

Shifting nursing care farther away from the patient when possible helps reduce staff exposure to the virus. One of the easiest ways to do this is to relocate infusion pumps from the bedside to just outside the room, where nurses can continue to monitor and provide treatment while reducing risk to themselves. The report provides extensive guidance into how this can be achieved based on various configurations and circumstances, while also addressing new issues, such as the need to provide extra boluses to reach the patient and secure tubing so that it is not tripped over.

Physiologic Monitoring

Physiologic monitoring often drives the need for ICU admission. This section provides guidance regarding how to move the monitor outside the room (as with infusion pumps) or leave it in the room and use a remote control device to prevent repeated access to the room while ensuring that it is visible from outside the room. It also addresses solutions for alarms, such as using baby monitors inside the room that relay information to a receiver outside.

Respiratory Care

Respiratory care is a central tenet of COVID-19 care and is also the riskiest aspect because of aerosolization of the virus. This section provides extensive guidance for safely providing respiratory care for patients, addressing ventilator circuits and medication management, the use of metered dose inhalers, ventilator alarm management, oxygen supply, noninvasive ventilation, managing medications for nonintubated patients, and respiratory procedures. It also discusses the implementation of prone positioning, which has been shown to be helpful in addressing hypoxemia in COVID-19 patients.

Pharmacy and Medication Management

Pharmaceutical care and coordination of COVID-19 patients is complex. This section provides insights into creating efficient ICU pharmacy operations and managing drug shortages. It also addresses the

importance of pharmacy-nurse coordination to minimize exposure risk, including by reducing room entry to administer medications, storing patient-specific medications, decreasing blood sampling for glucose monitoring (diabetes is a significant risk factor for serious illness due to COVID-19), and relocating the pump and medication management.

Room Environment

Beyond moving equipment outside the room, other room environment considerations can reduce risk. This section discusses appropriate donning and doffing zones and protocols, setting up communications between clinicians inside and outside the room, sanitizer dispenser location, and room cleaning and disinfection during and after the patient's stay. It provides a list of key supplies that reduce risk, such as positioning waste receptacles near the door and ensuring that there are in-room equipment decontamination wipes, as well as practices such as leaving cell phones outside the room and establishing a designated powered air-purifying respirator drying station between cleanings.

Patient Communication

Currently, visitors are rarely allowed in hospitals, so it is important to create a solution that helps patients and their loved ones communicate, such as setting up Facetime or Zoom calls every day. Hospitals can enlist social workers, patient representatives, and pastoral care providers to serve as ombudsmen and obtain health information from the clinician and provide it to the patient's loved ones on a regular basis.

Emotional Support for Staff

Serving on the front lines is overwhelming for clinicians and support staff, who know they are putting themselves at risk while also having fewer support systems to rely on due to social distancing. Hospitals must recognize the mental health challenges to their workers and provide professional psychological and emotional support as well as complementary approaches, such as mindfulness training and therapy animal visits.

Ramping Up Hospital Operations While Maintaining or Ramping Down Expanded ICU Capacity

Now that the curve is flattening, hospitals are resuming standard care, such as elective surgeries, and workers are anxious to return to their former jobs, ICU staff may be at a loss as to how to manage continued care of COVID-19 patients. It is important for administrators to work closely with ICU leaders to develop a transition plan, including reverse engineering of physical alterations that were necessary during the surge. Part of this plan should include addressing an expected second wave of COVID-19 patients during the fall and winter of 2020.

Moving Forward

While the pandemic is unprecedented, it is also a harbinger of future outbreaks, and it is vital that ICUs and health systems learn from their shared experiences to successfully address similar challenges if and when they occur. They must gather the lessons learned, take pictures and copious notes, and develop a plan that can readily be activated when needed in the future. In that vein, the living ICU configuration report is intended to be relevant for other large-scale infectious disease crises, which surely will come to our shores again.

Discovery VIRUS COVID-19 Registry Is a Game Changer:

It's Not Too Late to Join

The Society of Critical Care Medicine (SCCM) is leading a global COVID-19 registry to track intensive care unit (ICU) and hospital care patterns in near real-time. The Viral Infection and Respiratory Illness Universal Study (VIRUS) of Discovery, the Critical Care Research Network, will provide a rich database with insight into patient treatments and will guide future studies of COVID-19.

The outcomes of the year-long project, conducted in partnership with the Mayo Clinic, will be particularly helpful to guide management of patients during a possible second wave of the pandemic.

Featuring a regularly updated dashboard, the registry will identify trends for mechanical ventilation duration, ICU length of stay, ICU discharge details, types of medical support patients receive, and patient gender, age, and race. The database establishes an infrastructure for rapid data collection, analysis, and dissemination that would allow a nimble response to future outbreaks. This rapid data collection will also help identify important trends in various patient populations, including pediatric patients, to provide insight into unknown or new illnesses such as multisystem inflammatory syndrome in children associated with COVID-19.

"The COVID-19 pandemic has introduced unprecedented challenges to healthcare systems worldwide, but we live in a more connected world, and we must work together and learn from each other's experiences to help reduce the severity of the impacts," says Rahul Kashyap, MBBS, MBA, Mayo Clinic researcher and principal investigator of the Discovery VIRUS COVID-19 Registry. "This dissemination of aggregated knowledge shared in a single database in a timely manner will be the ultimate game changer."

The efforts of Dr. Kashyap and Ognjen Gajic, MD, FCCM, Mayo Clinic researcher and project mentor, have been critical in both crafting and carrying out the vision of the Discovery VIRUS COVID-19 Registry through another Discovery project, the Critical Care Data Dictionary. Thank you to co-principal

Join now at
sccm.org/virus



SNAPSHOT OF THE VIRUS COVID-19 REGISTRY

REGISTRY ENROLLMENT



Currently there are **17** countries and **200+** sites enrolled in the registry.

ADMISSIONS

Hospital admissions: **13,954**
ICU admissions: **3722**
Median age: **60**



HOSPITAL DISCHARGE STATS



Of **7545** patients:

80% discharged alive
20% deceased

COLLABORATIONS

SCCM is currently collaborating with the American College of Radiology, PointClickCare Technologies, Lyntek, and nference.



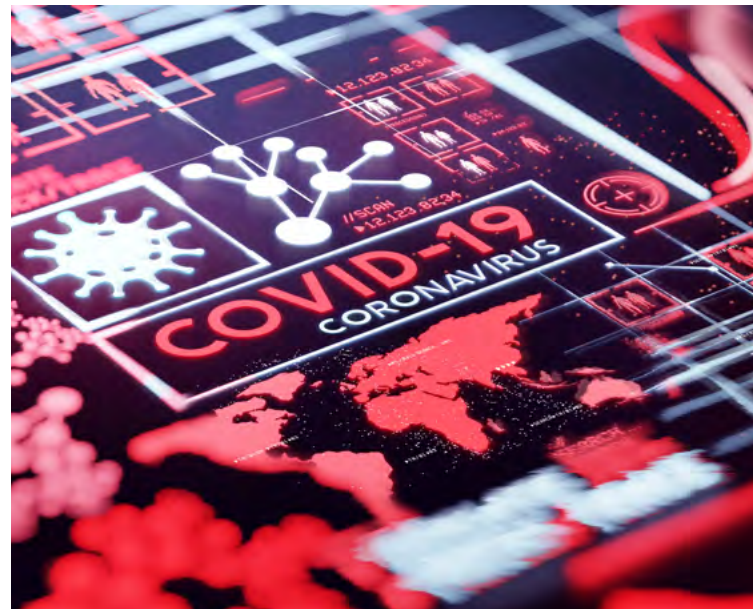
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investigators Allan J. Walkey, MD, MSc, associate professor in the Section of Pulmonary, Allergy, Sleep and Critical Care at Boston University School of Medicine, and Vishakha Kumar, MD, MBA, associate director for research at SCCM.

The Discovery VIRUS COVID-19 Registry is funded by the Gordon and Betty Moore Foundation, which fosters pathbreaking scientific discovery, environmental conservation, patient care improvements, and preservation of the special character of the San Francisco Bay Area. With the help of Mayo Clinic Ventures, the VIRUS COVID-19 Registry was also able to secure funding from Janssen Research & Development to support infrastructure and additional sites for data automation and entry.

Thank you to all our partners and collaborators:

- Mayo Clinic
- Lyntek Medical
- nference
- American College of Radiology: VIRUS imaging partner
- PointClickCare Technologies: providing de-identified patient data for nursing and long-term care facilities



VIRUS REGISTRY AIMS TO IDENTIFY EFFECTIVE TREATMENT STRATEGIES



Allan J. Walkey, MD, MSc, talks with iCritical Care podcast host Ashish K. Khanna, MD, FCCP, FCCM, about how rapidly the Discovery VIRUS COVID-19 Registry came together, its goals, and how it may change critical care research forever. Listen to the full podcast (episode SCCM-Pod 414) at sccm.org/podcast.

Dr. Khanna: *You helped start this registry in the middle of a pandemic. Can you tell us why and how?*

Dr. Walkey: It was apparent that COVID-19 was an unprecedented event in modern history and that our critical care community would be especially

affected. It was also apparent that anecdotal and opinion-based medicine was proliferating along with the virus. We urgently needed reliable data to inform our clinical decision-making. And so the Discovery VIRUS COVID-19 Registry was quickly assembled to bring data to COVID-19 care.

Dr. Khanna: *Is it true that Twitter and social media helped make this happen?*

Dr. Walkey: It is true. Vishakha Kumar and Rahul Kashyap were mulling over something about having a COVID-19 patient registry. Around the same time, I sent out a tweet asking if anyone was thinking about doing a COVID registry. Within an hour of sending out that tweet, I received a response from Ognjen Gajic at Mayo Clinic saying that Dr. Kashyap was interested in starting a registry. Within hours we were on the phone together, and before the end of the day we had a plan to move forward with the registry.

Dr. Khanna: *How is this dataset different from the several other large COVID-19 datasets?*

Dr. Walkey: The main difference is that this registry is focused on the ICU. We have lots of information about things that ICU physicians would be interested in, such as Acute Physiology and Chronic Health Evaluation (APACHE) and Sequential Organ Failure Assessment (SOFA) scores and the types of oxygen delivery devices that patients are getting. We have information on adjunctive therapies, including proning, inhaled nitric oxide, inhaled prostacyclin, mechanical ventilation settings, and mechanical ventilation parameters.

Dr. Khanna: *What are the long-term goals?*

Dr. Walkey: We think that the database can establish an infrastructure for rapid data collection, analysis, and dissemination that would allow nimble responses to future challenges. We would like to develop a system where we can move more seamlessly from hand-collected case report forms to automated uploads from electronic medical records. We're also working on ways to develop peer-reviewed methods for these real-time analyses that might occur in the background, so methods are peer-reviewed but the results are available to the public fairly quickly.

We hope clinicians can obtain the data and apply it to research questions. The big goal is that this is a learning resource for the world.

Dr. Khanna: *That brings me to my next point—the Medical Information Mart for Intensive Care (MIMIC). The MIMIC III has for years been our go-to ICU dataset. Do you envision the Discovery VIRUS COVID-19 Registry to be the next MIMIC or a dataset to work along with MIMIC? Someday, we will overcome COVID-19. I would hope the registry's skeletal framework for ICU data collection can still remain in place.*

Dr. Walkey: Yes, MIMIC has been a trailblazer and a groundbreaking resource. The hope is that whatever infrastructures are created as part of the registry can then be used in ways similar to MIMIC.

Dr. Khanna: *Dr. Walkey, thank you for everything that you're doing. It will bring the world together, and I am hoping that it will be one of the many positive things that comes out of very difficult times for the United States and for the entire world.*

Dr. Walkey: Thank you. One of the big lessons that I've learned—and something that I will take out of this project forever—is the huge spirit of collaboration and volunteerism seen in response to the registry. It's been really inspiring.

Ethics and Moral Distress Consultation Shape an Institutional Approach



Case

An 84-year-old woman with metastatic non-small cell lung cancer has been in the medical intensive care unit (MICU) for three weeks. She has multisystem organ failure requiring mechanical ventilation, three vasopressors, and renal replacement therapy. She does not have an advance directive and her three daughters are serving as her surrogate decision-makers. The healthcare team has consulted palliative medicine regarding transition of goals of care, but the daughters have declined to speak with them. The daughters insist on aggressive treatment, so full code status is in place. The daughters also request that their mother not receive analgesia and sedation because they want her to be alert when they visit. The team has explored transfer, but peer institutions state that they have nothing additional to offer and decline transfer. Medical center policy strictly prohibits placement of a do-not-resuscitate (DNR) order over the objection of a patient or surrogate.

The nurses are distressed. They feel that they are causing the patient pain with basic interventions. Their distress is amplified by their knowledge that the entire team believes that ongoing care is merely prolonging the patient's dying process, and yet they are prohibited from providing comfort care during what are likely her final days of life. The attending



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physician consults the ethics consult service about the provision of medically inappropriate care while being stymied by the medical center's policy on DNR orders. The attending physician asks, "Can I write a DNR order? To do so over the objections of the surrogates violates policy and places me in legal jeopardy." The attending physician also notes that caring for the patient is taking a toll on the MICU staff. Nurses are asking for reassignment to avoid caring for her multiple shifts in a row, and physicians are reluctant to provide updates to her daughters.

Because of the patient's grave prognosis, the ethics consultant documents that the MICU team is not obligated to provide medically inappropriate care and that it is ethically permissible to write the DNR order over the objection of her surrogates. The order is written, and the team's decision is communicated to her family. The team tells the family that they are not abandoning the patient and will continue to provide comfort care. Two days later, she develops sepsis and is made comfortable until she sustains cardiac arrest and dies with her daughters by her side. Despite a peaceful dying process, MICU staff continue to feel distress about the adversarial relationship they developed with the patient's family.

Ethics Analysis

Moral distress, now understood to be experienced by physicians, nurses, and other healthcare professionals, occurs when a clinician believes that he/she knows the ethically right action to take but is unable to take that action because of various constraints. In this case, moral distress arose when the family demanded aggressive treatment and inadequate pain management, causing the patient to suffer unnecessarily and the healthcare professionals to believe that they were betraying professional ethical values and practices. These are common root causes of moral distress identified in the academic literature; others include excessive documentation requirements that compromise patient care and lackluster administrative response to organizational problems. An almost universal precondition for moral distress is that the decision-maker(s) is not the person(s) who bear the burden of those decisions. This situation is also known as moral hazard. In this case, the patient's daughters were making decisions about her care but the patient and the MICU team were the ones bearing the very real burden of those decisions.

This medical center has both a clinical ethics consult service and a moral distress consult service, one of approximately 20 such services in the United States. A recognized “treatment” for moral distress in healthcare professionals is finding ways to change the systems that precipitate moral distress in the first place. With the guidance of both the ethics and moral distress consult services, healthcare professionals were able to advocate for a revision of the DNR policy to include shared decision-making between the patient/surrogate and the healthcare team. A working group of 30 interdisciplinary stakeholders was formed from multiple acute and intensive care units. Also included were representatives of the critical care division, the resuscitation committee, the medical center’s legal counsel, and the chief attorney from the physicians’ practice plan.

They developed a draft policy called “Code Status Orders and Associated Treatment Plans,” which states that patients/surrogates have the right to consent to or refuse offered resuscitative and end-of-life interventions and that members of the healthcare team have the “right . . . to maintain their professional and ethical integrity [and are] not required to . . . provide interventions that are outside the boundaries of accepted clinical practice.” During the drafting process, the practice plan attorney said that he did not believe he could defend physicians who refuse to provide interventions over the patient’s/surrogate’s objections. The working group chair responded that the attorney should be equally concerned with an institutional policy that did not allow clinicians to practice the standard of care and that obligated care that violates professional standards and causes them moral distress. Consensus was eventually reached, and the policy was approved and implemented. It contains a stipulation that medications for pain or comfort cannot be withheld based on surrogate request unless there is evidence that withholding them was the patient’s choice.

Recognizing that change was required beyond the institutional level, members of the medical center ethics and moral distress consult services were subsequently instrumental in precipitating amendment of the state statute, “Ethically and Medically Inappropriate Treatment Is Not Required.” The original statute outlined a due process procedure for patients/surrogates when they disagreed with medical care being withheld by medical teams. While the statute delineated obtaining a second medical opin-

ion and providing a 14-day period to attempt patient transfer during which life-sustaining treatment must be continued, it was silent on what happened after 14 days. Recognizing that some hospitals withdrew the medically inappropriate care while others continued to provide it, a statewide coalition of clinical ethicists, chief medical officers, and representatives of the hospital association and the health law association lobbied to have the state’s Joint Commission on Health Care convene a working group to review the statute. Representatives of the disability community, the Catholic diocese, and right-to-life organizations were included. Though the process took two years, the group strengthened the antidiscrimination provisions, solidified the due process patients and families undertake when disagreements occur, and allowed for unilateral withholding and withdrawal of treatment after the 14-day period.

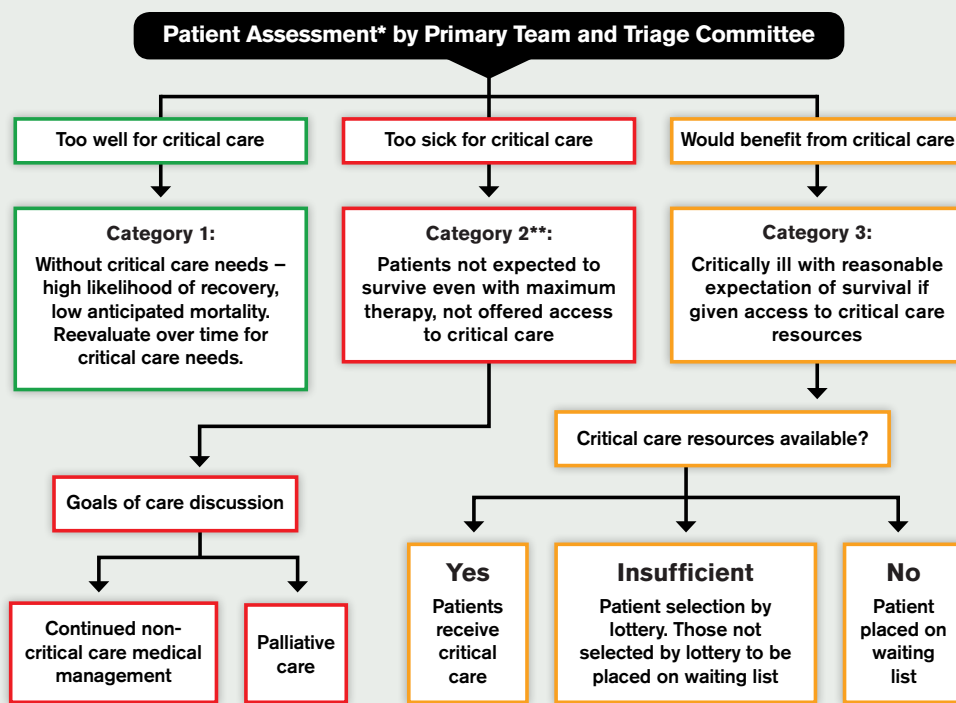
Ethics and moral distress consult services acknowledge that healthcare organizations are moral communities. We are interconnected, interdependent, and accountable to our colleagues, patients, families, the organization as a whole, and the communities we serve. We are responsible to and for one another. Addressing challenging clinical situations is work for a moral community—one that seeks input from multiprofessional colleagues, invites cognitive discourse, and works together to make effective and well-reasoned decisions for the good of our patients and for the staff who dedicate themselves to caring for them. This case is an example of how one medical center addressed its institutional challenges regarding end-of-life care.

This article is dedicated to Ann B. Hamric, FAAN, who was a mentor to the authors.

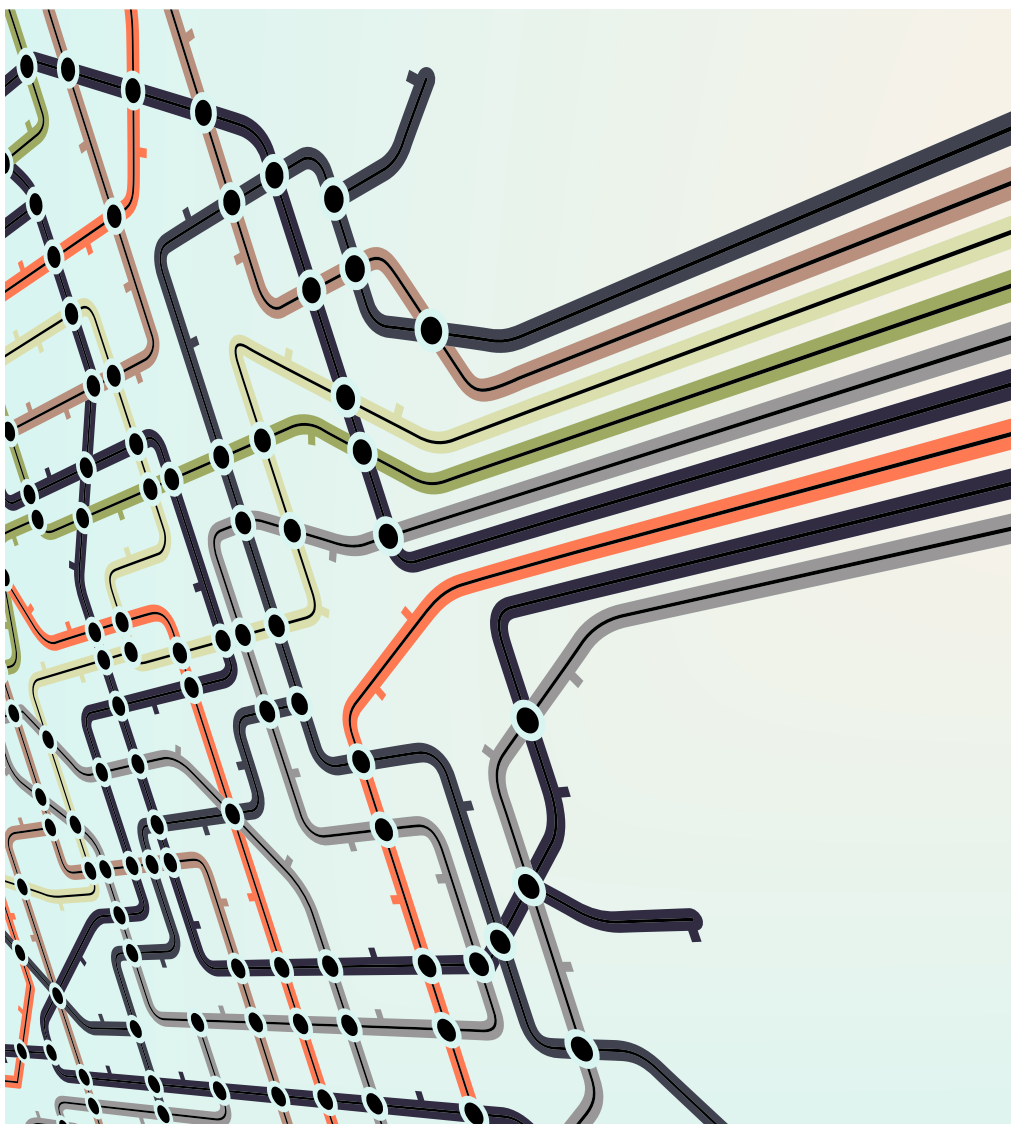
Be Prepared to Triage Critical Care Resources

Download SCCM’s Crisis Standard of Care Recommendations for Triageing Critical Resources at sccm.org/triage. During the COVID-19 Pandemic for guidance on assessing a hospital’s capacity status and setting up triage teams; it includes an algorithm for patient assessments.

Figure 1. Allocation Algorithm



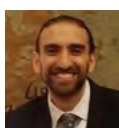
Fuzzy Logic in the Intensive Care Unit



AS MEDICAL PRACTICE BECOMES MORE SPECIALIZED AND INTRICATE, the role of diagnostics and the decisions regarding diagnosis, therapeutics, and monitoring become more complicated. The bedside clinician is often faced with uncertainty in the decision-making process, especially in the critically ill patient. Over the past decade, the reliance on artificial intelligence (AI) to assist with information processing in highly data-driven medicine has become common.¹

Artificial intelligence is based on computer rules, which classically are based on the Boolean system (otherwise known as *hard computing*), one of the first forms of computing. This system simply deals with binary logic (true or false, yes or no, 1 or 0). It works on exact data, producing exact results.² A simple illustration of this process would be: does the patient have hypertension? Diabetes? Sleep apnea? (yes=1 or no=0). However, a patient may have a subset of the disease, such as prehypertension, uncontrolled hypertension, or prediabetes, so AI wouldn't be able to categorize the disease state as either "yes" or "no." Imagine adding another layer of complexity with AI compiling many patient-specific data, disease states, and therapy options, coupled with algorithms and therapeutic decisions based on specific guidelines. The system would not be able to assist the clinician in the decision-making process because the system is too "inflexible." A multivalued system that can deal with "partial truths" is needed. It has been quickly recognized that the Boolean system does not apply in pragmatic medicine, as partial truths or falsehoods do occur.³ Real-life clinical situations require a different method of dealing with vagueness, thus the development of a subset of AI known as *soft computing logic*. This system should be able to perform the complex calculations and handle imprecise data to produce precise information for clinician use.³

To illustrate such an example, a patient admitted to the intensive care unit may either present with acute kidney injury, sepsis, altered mental status, or hemodynamic instability. Although these can be categorized as either yes (1) or no (0) via the Boolean system, pragmatically these disease states can present with different grades and severities (ordinal values such as 20% vs. 40%,



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or 5, 6, 7, etc). Couple this information with diagnostic results and baseline patient characteristics, and hard computing would not be able to assist the clinician. The information is no longer “clear,” but rather “fuzzy.” Soft computing logic would be able to compile the information, analyze it, and recommend an evidence-based treatment plan.

The term *fuzzy logic* (FL) was first introduced by Zadeh in 1965 when he described a method of “multi-valued logic resulting from fuzzy set theory to deal with imprecise reasoning.”^{4,5} The first paper describing the utility of FL was by Fujisaki in 1971, and this logic system has since been in use in many industries, such as engineering, aerospace, human resources, chemical engineering, manufacturing, and automotive technology.⁶

Fuzzy logic deals with uncertainty and imprecision, taking a set of fuzzy values and assigning a “membership.” This is followed by the application of the data set via preset rules of propositions to produce a “partial truth.”² Thus, FL attempts to deal with imprecise reasoning via a process in which a system aims to minimize the “noise” and make the best decision possible with the information at hand.³

To understand FL, one must be acquainted with the FL architecture, which consists of four parts³:

1. *Rule and knowledge bases*: the decision rules placed in the application by the programmers to manage the relation between program inputs and outputs. These bases are considered the most critical parts of FL system.
2. *Fuzzification*: the process of converting the data inputs into fuzzy sets and assigning membership values to each input.
3. *Inference engine*: the reasoning algorithm utilized to produce the fuzzy output from the fuzzy sets. This is the processing “brain” segment of the FL system.
4. *Defuzzification*: translating the fuzzy output into an understandable and actionable value for the clinician to act upon.

The advantage of utilizing FL is that it mimics the processes of how the human brain works. Fuzzy logic moves from a binary language to a continuous language, where more variables can be evaluated. Contrary to its name, FL is not fuzzy, but rather it is associated with robustness, simplified data input, and clear representation and production. The rules as-

While there are concerns that FL may lead to incorrect medication selection and prescription, a very small percentage of errors actually occurs, with a rate of approximately 0.08% being common.



sociated with FL are easier and dramatically fewer compared with the Boolean method, and this translates to easier system work.³

As with all programs, limitations exist. Every clinician should be aware of these while utilizing FL. These include but not limited to³:

5. Difficulty in developing a fuzzy model for use. This requires extensive training and knowledge of programming.
6. Ensuring that the knowledge base entered is correct and has been tested repeatedly for accurateness. An incomplete or corrupt knowledge base will affect the results.
7. Validating the rule base. This avoids any conflicts that may render the results invalid.
8. Thoroughly testing of the reasoning engine (inference engine). This ensures logic correctness.
9. Human error. As with any system, if the input is incorrect, the results will be incorrect as well. Thus, ensuring appropriate training of the healthcare provider is essential for program success.

Applications in the ICU

In the ICU environment, seconds and minutes make a difference in patient outcomes and lives. From the time a medical decision is reached to the time the treatment is delivered, each decision tree or point of contact with the electronic health record adds an exponential amount of time to the process. The principles of FL expedite the point in the process where providers spend most of their clinical time: with computerized physician order entry (CPOE).

The transition from written orders to CPOE has resulted in an optimization of patient safety. As early as 2005, significant improvements in patient safety were realized with CPOE.⁸ However, as these systems become more robust, they can overwhelm the clinician with information. The wealth of information processed with each interaction with the electronic health record has also been blamed for physician burnout and morale injury, because providers are not able perform core functions without being inundated with information.⁹ A majority of residents claimed that they made medication errors because they were not able to see all information pertinent to the patient’s medications.⁸ As electronic health record databases grow, the number of alerts and the corresponding alert fatigue grow, resulting in a need for a system redesign.⁸

Fuzzy logic allows a clinician to move efficiently through the medical record at the time of order entry. If a physician intends to place an order for an epinephrine infusion but misspells “epinephrine,” the FL programming recognizes that the clinician intended to order epinephrine and prepares the order composer accordingly. The physician is still required to verify the correct drug and address any alerts.

While there are concerns that FL may lead to incorrect medication selection and prescription, a very small percentage of errors actually occurs, with a rate of approximately 0.08% being common.¹⁰

With these points in mind, one can see that the amount of logic and programming needed for FL to occur ... is not very fuzzy at all.

Critical Care Documentation and Billing Update: COVID-19 Pandemic



Introduction

The COVID-19 pandemic has presented a unique set of challenges. These challenges have been tempered to some extent by provisions made by the American Medical Association and Centers for Medicare and Medicaid Services (CMS) to assist with the billing and documentation burden. Their goals are to create temporary hospitals, facilitate out-of-state hiring of providers, increase access to telemedicine, increase availability of testing, and minimize paperwork. We discuss some of the key points about appropriateness of documentation and billing based on guidance provided by these organizations.

ICD-10-CM Coding for COVID-19

For a confirmed diagnosis, assign code U07.1, COVID-19. If the provider documents “suspected,” “possible,” “probable,” or “inconclusive” COVID-19, do not assign code U07.1; instead code by symptom or other illness.

When COVID-19 meets the definition of principal diagnosis, code U07.1, COVID-19. Confirmation can be determined by testing or by the provider’s documentation. Code U07.1 should be sequenced first, followed by the appropriate codes for associated illnesses such as acute respiratory illness, renal failure, etc., except in the case of pregnancy.

For acute respiratory illness with COVID-19, use U07.1 followed by the appropriate code depending on the presentation, such as:

- J12.89: other viral pneumonia
- J80: acute respiratory distress syndrome (ARDS)
- J22: unspecified acute lower respiratory infection

For pregnant patients, the chapter 15 diagnosis codes (O00-O9A) take sequencing priority. In these cases, use the principal diagnosis code O98.5-, other viral diseases complicating pregnancy, followed by U07.1.

For example, a patient with COVID-19, ARDS, and acute renal failure would be coded as U07.1 (COVID-19), J80 (ARDS), and N17.9 (acute renal failure).

For patients presenting with any signs or symptoms associated with COVID-19 (such as fever) but for whom a definitive diagnosis has not been established, assign the appropriate code(s) for each of the presenting signs and symptoms, such as:

- R05 for cough
- R06.02 for shortness of breath
- R50.9 for fever, unspecified

For a patient exposed but without a COVID-19 laboratory diagnosis, use Z20.828-, contact with and (suspected) exposure to other viral communicable diseases.

To learn more about appropriate use of ICD-10 codes, refer to <https://bit.ly/2Ee9Egl>.

ICU Services Under Revised CMS Policy

CMS has incorporated several key temporary regulatory waivers to help providers deal with

the COVID-19 pandemic. These are effective immediately.

Most relevant to critical care practitioners are the following codes:

- Emergency department visits, levels 1-5 (CPT codes 99281-99285)
- Critical care services (CPT codes 99291-99292)
- Initial and continuing intensive care services (CPT codes 99477- 99480)
- Initial hospital care and hospital discharge day management (CPT codes 99221-99223 and 99238-99239)
- Inpatient neonatal and pediatric critical care, initial and subsequent (CPT codes 99468- 99473 and 99475-99476)
- Remote patient monitoring (CPT codes 99091, 99457-99458, 99473-99474, 99493-99494)
- Critical care consult codes more than once per day (CPT codes G0508-G0509)

Extending the reach of physicians is being accomplished in other ways as well. Physicians can now supervise trainees virtually for nonsurgical therapies. CMS is temporarily waiving 482.12(c)(1-2) and (4) so that physician assistants and nurse practitioners can independently care for Medicare and Medicaid patients.

Billing for procedures remains unchanged and requires appending appropriate ICD-10 diagnosis code and modifiers.

CMS Telemedicine Rules During the COVID-19 Public Health Emergency

Telemedicine is a great approach for the COVID-19 pandemic because it allows for patient care while practicing social distancing. Telemedicine is not new but providing the breadth and diversity of healthcare services that COVID-19 demands creates new challenges, including documentation and reimbursement.

Under these new guidelines, providers can care for established or even new patients regardless of geographic location. Services include emergency department, 24-hour observation stays, hospital admission, and daily care, including ICU, nursing facility visits, home visits, care planning for cognitive impairment, psychological care, physical and occupational therapy, speech therapy, and licensed social work.

CMS can provide accelerated or advance payments during the pandemic to a Medicare

provider if the provider requests the appropriate Medicare Administrative Contractor and meets the required qualifications. Details on this process can be found here: <https://go.cms.gov/32PIPKU>

A complete list of telemedicine services is available at <https://go.cms.gov/2CFb1UI>

The requirement for specific state licenses to practice telemedicine within that state has temporarily been waived, with some limitations. Provider must have a state license in the United States, be enrolled in Medicare program, be providing telemedicine to a state in a pandemic emergency, and not be prohibited from practicing medicine in the state.

CMS has changed restrictions on making referrals for healthcare services to other entities which with the physician may have a financial relationship. Physician-owned hospitals can temporarily increase their bed capacity and not be in violation of Stark Law.

COVID-19-Specific Miscellaneous Key points

- Any qualified provider can bill for critical care services. This is not limited to critical care practitioners only.
- Critical care services are not location specific and can be provided to the patient in any designated in-hospital location.
- Time rules for critical care services still apply, along with appropriate use of modifiers for procedures that are not bundled.

In conclusion, while new temporary standards and definitions have been created to guide documentation and billing during the COVID-19 emergency, we urge readers to seek guidance from their quality and compliance teams to ensure appropriate application.

Reference the Society of Critical Care Medicine's COVID-19 Rapid Resource Center for more information about coding during the pandemic. Visit sccm.org/covid19rapidresources.



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Section and Chapter News

THE SOCIETY OF CRITICAL CARE MEDICINE (SCCM) has 15 specialty sections to accommodate members of different professions and disciplines. Members may join up to three sections for unique opportunities to network with colleagues and become more involved in projects and initiatives while advancing SCCM's mission. For more information on joining a specialty section, visit sccm.org/membership.

Clinical Pharmacy and Pharmacology Section

Check out the April 2020 Clinical Pharmacy and Pharmacology (CPP) newsletter and supplement containing session summaries from Congress and spotlights on CPP Section members who have made an impact on critical care pharmacy. Future 2020 newsletters will continue to highlight SCCM's 50th anniversary.

April, May, and June CPP Journal Clubs were postponed due to COVID-19. Mini-interviews remain available through SCCM Connect. This year's first research webcast, "Models of Translational Research in Critical Care," is scheduled for July. Stay tuned for pharmacy microlearning webcasts on COVID-19.

The Mentor-Mentee Program provides CPP Section members with expert guidance. A program toolkit is available on SCCM Connect for other sections to use. For more information, contact Meagan Latham (Meagan.Latham@franciscanalliance.org) or Scott Nei (Nei.Scott@mayo.edu).

Visit the Research Forum at <https://cppresearchforum.jcink.net/> to access quarterly "Ask Me Anything" events, a grant funding database, and research discussions. Research consult and manuscript/grant review services are also available. View the monthly CPP Pharmacotherapy Literature Update on SCCM Connect and Twitter. Contact Alexander Flannery (alex.flannery@uky.edu) or Brandon Hobbs (brandon.hobbs@orlandohealth.com) for more information.

The CPP Program Committee Visiting Clinical Professor Program hosted the webcast "Integrating Critical Care Pharmacists into Safe and Effective Care Delivery in the SARS-CoV-2 Pandemic." Find it On Demand in the SCCM COVID-19 Resource Center. Contact Chris Carter (christopher.carter@ssmhealth.com) for more information.

The CPP Practice Advancement Committee conducted a practice-based survey on ICU pharmacy services and is developing a time-motion study to evaluate pharmacist-to-patient ratios and burnout. The committee is also developing leadership succession pathways within SCCM. Contact Mitchell Buckley (Mitchell.buckley@bannerhealth.com) and Christine Groth (christine_groth@urmc.rochester.edu) to become involved.

Emergency Medicine Section

As of July 1, 2020, the American Board of Emergency

Medicine and American Board of Surgery offer a pathway to surgical critical care board certification for emergency physicians who completed a surgical critical care training program before 2012. This pathway is time limited and will conclude on June 30, 2023. Details can be found at https://www.absurgery.org/default.jsp?certscce_abem. Please contact us through SCCM Connect for further information or if you have any questions!

Internal Medicine Section

Who could have imagined the world would have changed so much since the SCCM Congress this past February? In retrospect, we were fortunate to have had such a great meeting before the global COVID-19 pandemic. We realize life has been hard for many of you during the past few months, including challenging clinical and administrative responsibilities. As intensive care clinicians, we are truly at the front lines in this unprecedented time. Thank you for all you do. Please remember to take care of yourselves; it is crucial that we are there for each other. Let's hope for happier times ahead.

The Internal Medicine (IM) Section Steering Committee continues to meet (virtually) and advocate for our members. Our main goals include building on our already successful endeavors, including the intensivist-in-practice initiative, and the recently created Geriatric Knowledge Education Group.

In addition, we are working toward developing a series of webcasts led by IM Section members and directed to the SCCM membership. Watch for additional information to be advertised soon.

The Steering Committee is always looking for ways to further engage our members, so if you have input, feedback, or suggestions, please let us know. Along these lines, there will be three openings on our Steering Committee this year, so please consider running for one of these seats. Serving on the Steering Committee is a great way to give back. More details on the application process will be available this fall.

Be safe, and hopefully we will all be able to meet again soon.

Nursing Section

The Nursing Section is proud to announce the nomination of Lauren Sorce PhD, RN, CPNP-AC/PC, FCCM, as a member of SCCM's Executive Committee. With this nomination, Lauren will be promoted

to president of SCCM in 2024! The Nursing Section could not be prouder!

Lauren is a pediatric critical care nurse practitioner at Ann & Robert H. Lurie Children's Hospital of Chicago in Chicago, Illinois, USA, where she has practiced for 17 years. She is the manager of the PICU advanced practice nurse team and the codirector of clinical research. Lauren's research interests include respiratory diseases, human milk as a biological agent in severity of illness, noise, and sedation. She has spoken locally, nationally, and internationally on a variety of topics.

Lauren completed her BSN at Loyola University in 1988. She returned to Loyola in 1995 to complete her MSN. In 1997, Lauren completed her pediatric nurse practitioner program at Rush University. In 2019, she earned her PhD from Rush.

Lauren has been a member of SCCM since 1998. She has served in several leadership roles within the Nursing Section before becoming the Nursing Section Council liaison. She has been involved in multiple committees and has presented at the annual Congress.

Since SCCM's inception, only three past presidents have been nurses.

CONGRATULATIONS, LAUREN!!

Osteopathic Medicine Section

At the time of this writing, pre-COVID time is a bit of a distant memory. The Osteopathic Medicine Section held its business meeting during the SCCM Critical Care Congress in Orlando, Florida, USA. The meeting was successful. Najwan Augustin, DO, was awarded the Osteopathic Medicine Section Travel Grant for his work on abstract #889, Dexmedetomidine and Length of Stay in Subjects with Alcohol Withdrawal Syndrome: A Meta-Analysis. He received \$500. Jennifer Axelband, DO, was elected as the section Steering Committee chair-elect, starting at the 2021 Congress.

We reviewed the section's history with James E. Hoogeboom, DO, FACS, FCCM, and discussed the section's original mission. We approved several initiatives for this coming year to make sure we are serving our members and adding value to the Society. Based on the historical perspective given and future needs, we plan to draft and adopt a "functional" mission statement.

Our section has many members, and one of our goals this year is to increase member participation. We also want to find ways to facilitate cooperation

among members. And we will explore options for holding a members' reception at the next live Congress.

Physician Assistant Section

The Physician Assistant (PA) Section would like to wish health and safety to all in these difficult times. The section is excited to announce its strategic objectives for the year. Our goal is to engage our members and promote involvement. We are creating and offering opportunities to encourage professional growth while making an impact on our section and SCCM.

The PA Section leadership has created four subcommittees:

- **Social Media:** The goal is to increase PA visibility both within the Society and outside the critical care community. If you are on Twitter, please follow hashtag #PhysicianAssistICU to offer and receive up-to-date PA critical care announcements.
- **Membership:** The charge is to reach non-PA Section members. Check your section engagement by logging into MySCCM. Section membership is free!
- **Mentorship:** Many PAs are offered leadership and administrative roles or positions that require a different skill set. Having resources for support or direction can improve your success. This subcommittee will pair you with a mentor or offer experienced resources.
- **Postgraduate Residency:** As critical care postgraduate residencies and fellowships become more popular, we would like to be the go-to Society. Through the Society's Sponsored Fellowship Program, PA residents and fellows have an opportunity to join SCCM for free.

Keep your eyes open for the advanced practice provider (APP) workflow survey, which will provide the current work environment and responsibilities of APPs across the country. These data will be an important addition to the limited body of research related to critical care APPs.

Each year the PA Section sponsors an SCCM webcast. Do you have a topic of interest, or are you interested in being a speaker? Are you interested in getting involved in the section or helping with a committee or webcast? Do you have any questions or concerns? Please let us know!

Peter Sandor, MBA, PA-C, RRT, FCCM. PeterICU-PA@yahoo.com

Pediatrics Section

The Pediatrics Section will have openings for two member-at-large seats on the Steering Committee. Show your interest in the Pediatrics Section by submitting a nomination. Self-nominations are accepted and encouraged.

The members-at-large will be responsible for providing assistance and support to the section officers as needed. This may include participation in committees or subcommittees, educational activities, involvement

in the Guardians mentorship program, and attending monthly Steering Committee conference calls. The two-year term (2021-2023) will begin at the conclusion of the section business meeting during SCCM's 50th Critical Care Congress. On completion of a two-year term, the member will have the opportunity for competitive reelection to a second term.

Nominees must be members of the Pediatrics Section and must have shown commitment to volunteering for SCCM activities through active prior participation in at least one of its committees. We specifically encourage application by section members with significant SCCM committee experience. The Pediatrics Section Steering Committee values diversity and encourages multidisciplinary involvement.

Nominees will be required to submit a short (half-to full-page) biography covering the following topics:

1. Educational background
2. Current and previous employment
3. History of SCCM involvement
4. Reason for interest in the position

Stay tuned. Additional details, including application deadline, will be circulated to the section through SCCM Connect. In the meantime, feel free to submit your nomination to Pediatrics Section Chair Alexandre Rotta, MD, FCCM (alex.rotta@duke.edu).

Research Section

The Basic and Translational Research Subcommittee seeks to advance the mission of the Research Section in fostering, teaching, and promoting basic and translational science within the Society. The subcommittee is composed of a diverse group of clinician-scientists with an interest in informing an agenda for basic and translational research as it relates to critical illness and injury. During the past year, the subcommittee has continued to work to expand opportunities for members of the Research Section by supporting mentoring events at Congress and exploring ways to engage clinical scientists through Discovery, the Critical Care Research Network. The subcommittee had an excellent meeting at the 2020 Congress and devised a strategic plan for the coming year.



With the advent of the COVID-19 pandemic, the subcommittee has engaged numerous physician-scientists to develop a comprehensive mechanistic understanding of SARS-CoV-2 infection. A manuscript is pending. The authors include Elizabeth M. Tucker, MD; Sujatha Kannan, MD; Jamie L. Sturgill, PhD; Travis R. Sexton, PhD; Peter E. Morris, MD; Andrew C. Miller, MD; Robert I. Parker, MD; Jay L. Koyner, MD; Rana B. Hejal, MD; Scott C. Brakenridge, MD; Lyle Moldawer, PhD; Phillip A. Verhoef, MD, PhD; Christopher Jones, MD; Stuart H. Friess, MD; Richard S. Hotchkiss, MD; Allan Doctor, MD; and Kenneth E. Remy, MD, MHSc.

Because of the pandemic, in the upcoming year the subcommittee will explore opportunities to use web-based learning platforms for educational

endeavors, including webinars on how to read a heat map, understanding flow cytometry data, RNA-Seq, proteomics data, and other bench science topics. We are interested in recruiting members of the critical care community with an interest or focus in basic or translational research. For additional information or to join the subcommittee, email the subcommittee Chair Kenneth E. Remy, MD, MHSc, MSCL, FCCM, at kremy@wustl.edu.

Surgery Section

The Surgery Section wishes to extend our gratitude and support for all healthcare professionals confronting the COVID-19 pandemic. The section continues its mission of supporting the education and advancement of healthcare professionals treating critically ill and injured patients. Some of our ongoing projects are:

- Support for FCCM applications and letters. Visit your Surgery Section on SCCM Connect for details on the process: <https://www.sccm.org/professional-development/accm/apply-for-fccm>. 
- SCCM Historical Project. Trace the beginnings of the Society's multiprofessional mission involving most sections.
- Surgical Critical Care Genealogy Project. This database will catalog the historical interconnectedness of all surgical intensivists. You can help by completing this survey: <https://www.surveymonkey.com/r/sgtk5c6>. 
- Critical Care Quiz show for SCCM fellows. This has been a popular event we hope to continue.
- Stop the Bleed. The event was a great success last year. We continue to plan future training events.
- Collaborate with multiple societies on surgical critical care education and scholarships. These include SCCM, American Association for the Surgery of Trauma, and Surgical Critical Care Program Directors Society.
- Advancing the Surgery Section through SCCM ranks. Current SCCM Council members are: Lewis J. Kaplan, MD, FACS, FCCM; Anthony T. Gerlach, PharmD, FCCM; Pauline K. Park, MD, FCCM; Jose L. Pascual, MD, PhD, FACS; and Samuel A. Tisherman, MD, FCCM.

We encourage you to remain digitally connected through SCCM Connect, especially as we move toward a virtual 2021 Congress. If you would like to get involved with these activities or participate in our committees (Education, Patient Safety, Strategic Planning, and Membership) please contact Surgery Section Chair Susan L. Evans, MD, FCCM, at susan.evans@atriumhealth.org.

Sal Ahmad, MD, FACS, FCCM
Chair-Elect, Surgery Section

Uniformed Services Section

Engagement in SCCM by Uniformed Services

Section and Chapter News

(US) Section members has surged as we strive to promote our unique experiences in military medicine. At SCCM's 49th Congress we had record attendance at our section meeting and numerous speakers from our ranks. Seven of our members become Fellows of the American College of Critical Care Medicine. Section leadership transitioned during Congress, with Commander J. Jonas Carmichael, MD, FCCM, rising to chair, Lieutenant Colonel Christopher J. Colombo, MD, FCCM, elected vice-chair, and Major William Mulvoy, MD, MBA, elected secretary.

Another amazing contribution of our members was the development of the Fundamental Critical Care Support: Resource Limited (FCCS: RL) course. The course develops a problem-solving skill set for resource allocation, triage, and ethical implications for healthcare professionals to care for critically ill and injured patients in austere environments. At the 49th Congress the course was such a success that the US Section discussed strategies for scheduling more courses, developing course instructors, and working on military-civilian partnerships. Any healthcare professional interested in expanding their capabilities and learning a new spin on the practice of critical care is encouraged to visit the FCCS: RL web page at <http://www.sccm.org/fundamentals/fccs-resource-limited>.

To help the US Section expand, we are asking for volunteers to participate as liaisons with other sections and be more active in SCCM. Find the Creative Community for Critical Care page on the SCCM website, complete a committee application, and sign a conflict-of-interest form. It's as easy as that to make a difference!

Carolinas/Virginias Chapter

The Carolinas/Virginias Chapter of SCCM serves over 400 members across North and South Carolina, Virginia, and West Virginia to foster collaboration to enhance patient care.

The 38th Annual Scientific Symposium was held virtually via webinar on June 5, 2020, and was a great success! Many expert speakers presented, including a keynote speech on biomarkers by SCCM President Lewis J. Kaplan, MD, FACS, FCCP, FCCM. Research and quality improvement projects from around the region were showcased. If you would like to be involved with planning the 2021 Annual Scientific Symposium and Pharmacology Pre-Conference, please join the Education Committee!

The Mentorship Committee has launched the Mentor-Mentee Program, which offers mentorship for fellowship applications to the American College of Critical Care Medicine (FCCM), clinical practice, teaching and precepting, management, and more!

Other committee opportunities to increase your engagement include: Communications, offering quarterly newsletters and Twitter Journal Clubs; Membership, focusing on recruitment and re-

tention; Nominations, soliciting nominations for the Board of Directors; Outreach, providing local and global outreach opportunities; and Research, promoting collaborative research opportunities across the region.

Please visit our website at www.cvcscm.org, contact us at cvcscm@gmail.com, and follow us on Facebook at SCCM Carolinas/Virginias Chapter and Twitter @CVCSCCM if you are interested in learning more, joining our chapter, seeking a mentor, or volunteering for a committee!

Texas Chapter

The SCCM Texas Chapter is a multidisciplinary organization composed of over 650 critical care practitioners. The chapter represents the entire state and has four major regions: Houston, Dallas, San Antonio, and El Paso. High-quality programming has continued in the state despite issues surrounding the COVID-19 pandemic. In June, the chapter held a webinar with a panel of experts representing multiple disciplines. We also delivered treats to various ICUs across the state to show appreciation to our frontline workers. The chapter is slated to award the second annual Joseph L. Nates, MD, MBA, MCCM, Research Grant, a \$4000 award to fund clinical research designed to enhance the care and outcomes of critically ill patients.

The Texas Chapter is in the final planning phase of our 9th Annual SCCM Texas Chapter Symposium. This year's theme is Closing the Knowledge Gap. The symposium will be held September 25-26, 2020, at Children's Hospital in San Antonio, Texas. SCCM President Lewis J. Kaplan, MD, FACS, FCCP, FCCM, has been invited to be the keynote speaker. Continuing education credit will be awarded for the various disciplines. We are also planning to hold our community outreach event and teach layperson skills that may be helpful in emergency situations, such as hands-only CPR and bleeding control. If you are interested in attending the symposium or learning more about the work the Texas Chapter is doing, please visit our website (www.sccmtexaschapter.org) and follow us on Facebook, Twitter @scctxchapter, and Instagram for the most up-to-date notifications of our activities.

Northeast Chapter

At the 49th Critical Care Congress, members from the Northeast Chapter met to discuss the chapter's growth and activities during the past year. As in previous years, attendance at the annual business meeting continues to increase. Membership is up and continues to rise. Thank you all to our new members and those who continue to support our chapter. We have an exciting year planned.

At this year's business meeting, President James E. Lunn, RRT, MHS, PA-C, FCCM, presented the

second annual SCCM Northeast Chapter Clinical Congress Scholarship Award to Ash Seth, PA-C, MBA, FCCM, from St. Francis Hospital in Roslyn, New York. Congratulations! The award is well deserved for his contributions to ongoing research and support in critical care.

Steering Committee Member Peter S. Sandor, RRT, MHS, PA-C, FCCM presented the 987 Award to Ash Seth, PA-C, MBA, FCCM. The award memorializes Joseph M. Civetta, MD, FCCM, who died in March 2016. Mr. Seth has been fundamental to the development and continued growth of the point-of-care ultrasound course and the Northeast Chapter.

Educational and outreach opportunities, which have always been a focus of the chapter, have continued to grow over the past year. In 2019, the chapter sponsored four Fundamental Critical Care Support courses, incorporating hybrid simulation, at Trinity Health of New England - St. Francis Hospital and Medical Center. At the fifth annual introduction to the point-of-care ultrasound course, Peter Sandor; Ash Seth; James Lunn; Scott May, BCCCP, BCPS, PharmD; and Guy Aristede, MD invested their time to develop a new curriculum. The course was sold out, with 27 attendees from seven different hospitals and representing five states that the chapter serves.

This year, the chapter will again help support and give back to the region we serve by participating in a one-day medical camp led by President James Lunn. In 2019, multiprofessional providers from many facilities provided a variety of services at the camp to more than 240 patients in just six hours. We hope to have a significant presence at the camp again in June 2020. Our chapter is also making arrangements to support and participate in a Stop the Bleed program on June 6, 2020, in Hartford, Connecticut's Yard Goats Stadium.

In November, 2019, Robert C. Gibson, ACNP, and his team hosted the two-day 2nd Annual Western New York Critical Care Symposium. Turnout was great, with attendance doubled from the previous year. The chapter provided support for the conference and sponsored one of the speakers, our own member Fraser Mackay, MD. Great job, Bob and his team! Thanks for orchestrating the Northeast Chapter's presence. We look forward to this year.

We encourage members to consider getting more involved in the chapter. This year we will review the bylaws and will reach out to the members for assistance in this process. Additionally, the Steering Committee will welcome assistance with growing the chapter's presence on social media platforms, including Twitter and TikTok.

If you are not a current member and are interested in joining our chapter, you can do so through the SCCM website. If you are interested in learning more about our chapter, contact us at scmne@gmail.com or follow us on Facebook or Twitter.

SMOFLIPID (lipid injectable emulsion), for intravenous use

BRIEF SUMMARY OF PRESCRIBING INFORMATION

This brief summary does not include all the information needed to use Smoflipid safely and effectively. Please see full prescribing information, including Boxed Warning for Smoflipid (lipid injectable emulsion), for intravenous use at www.smoflipid.com.

WARNING: DEATH IN PRETERM INFANTS

- Deaths in preterm infants after infusion of intravenous lipid emulsions have been reported in the medical literature.
- Autopsy findings included intravascular fat accumulation in the lungs.
- Preterm infants and low-birth-weight infants have poor clearance of intravenous lipid emulsion and increased free fatty acid plasma levels following lipid emulsion infusion.

INDICATIONS AND USAGE

Smoflipid is indicated in adults as a source of calories and essential fatty acids for parenteral nutrition (PN) when oral or enteral nutrition is not possible, insufficient, or contraindicated.

Limitations of Use:

The omega-6: omega-3 fatty acid ratio and Medium Chain Triglycerides in Smoflipid have not been shown to improve clinical outcomes compared to other intravenous lipid emulsions.

DOSAGE AND ADMINISTRATION

The recommended daily dosage in adults is 1 to 2 grams/kg per day and should not exceed 2.5 grams/kg per day. Smoflipid 1000 mL is supplied as a Pharmacy Bulk Package for admixing only and is not for direct infusion. Prior to administration, transfer to a separate PN container.

CONTRAINDICATIONS

Known hypersensitivity to fish, egg, soybean, or peanut protein, or to any of the active ingredients or excipients.

Severe hyperlipidemia or severe disorders of lipid metabolism with serum triglycerides > 1,000 mg/dL.

WARNINGS AND PRECAUTIONS

- Death in Preterm Infants: (see BLACK BOX WARNING)
- Hypersensitivity Reactions: Smoflipid contains soybean oil, fish oil, and egg phospholipids, which may cause hypersensitivity reactions. Cross reactions have been observed between soybean and peanut oil. Signs or symptoms of a hypersensitivity reaction may include: tachypnea, dyspnea, hypoxia, bronchospasm, tachycardia, hypotension, cyanosis, vomiting, nausea, headache, sweating, dizziness, altered mentation, flushing, rash, urticaria, erythema, pyrexia, or chills. If a hypersensitivity reaction occurs, stop infusion of Smoflipid immediately and undertake appropriate treatment and supportive measures.
- Risk of Catheter-Related Infections: Lipid emulsions, such as Smoflipid, can support microbial growth and is an independent risk factor for the development of catheter-related bloodstream infections. The risk of infection is increased in patients with malnutrition-associated immunosuppression, long-term use and poor maintenance of intravenous catheters, or immunosuppressive effects of other concomitant conditions or drugs.
- Fat Overload Syndrome: This is a rare condition that has been reported with intravenous lipid emulsions. A reduced or limited ability to metabolize lipids accompanied by prolonged plasma clearance may result in a syndrome characterized by a sudden deterioration in the patient's condition including fever, anemia, leukopenia, thrombocytopenia, coagulation disorders, hyperlipidemia, fatty liver infiltration (hepatomegaly), deteriorating liver function, and central nervous system manifestations (e.g., coma).
- Refeeding Syndrome: Reintroducing calories and protein to severely undernourished patients with PN may result in the refeeding syndrome, characterized by the intracellular shift of potassium, phosphorus, and magnesium as the patient becomes anabolic. Thiamine deficiency and fluid retention may also develop.
- Aluminum Toxicity: Smoflipid contains no more than 25 mcg/L of aluminum. During prolonged PN administration in patients with renal impairment, the aluminum levels in the patient may reach toxic levels. Preterm infants are at greater risk because their kidneys are immature, and they require large amounts of calcium and phosphate solutions, which contain aluminum. Patients with

renal impairment, including preterm infants, who receive parenteral intakes of aluminum at greater than 4 to 5 mcg/kg/day can accumulate aluminum to levels associated with central nervous system and bone toxicity. Tissue loading may occur at even lower rates of administration of PN products.

- Risk of Parenteral Nutrition-Associated Liver Disease (PNALD): PNALD has been reported in patients who receive PN for extended periods of time, especially preterm infants, and can present as cholestasis or steatohepatitis. The exact etiology is unknown and is likely multifactorial. Intravenously administered phytosterols (plant sterols) contained in plant-derived lipid formulations have been associated with development of PNALD, although a causal relationship has not been established. If Smoflipid-treated patients develop liver test abnormalities, consider discontinuation or dose reduction.
- Hypertriglyceridemia: Impaired lipid metabolism with hypertriglyceridemia may occur in conditions such as inherited lipid disorders, obesity, diabetes mellitus, and metabolic syndrome.
- Monitoring/Laboratory Tests: Routinely monitor serum triglycerides, fluid and electrolyte status, blood glucose, liver and kidney function, blood count including platelets, and coagulation parameters throughout treatment. Monitoring patients for signs and symptoms of essential fatty acid deficiency (EFAD) is recommended.
- Interference with Laboratory Tests: Content of vitamin K may counteract anticoagulant activity. The lipids contained in this emulsion may interfere with some laboratory blood tests (e.g., hemoglobin, lactate dehydrogenase [LDH], bilirubin, and oxygen saturation) if blood is sampled before lipids have cleared from the bloodstream.

ADVERSE REACTIONS

Most common adverse drug reactions >1% of patients who received Smoflipid from clinical trials were nausea, vomiting, hyperglycemia, flatulence, pyrexia, abdominal pain, increased blood triglycerides, hypertension, sepsis, dyspepsia, urinary tract infection, anemia and device-related infection.

Less common adverse reactions in ≤ 1% of patients who received Smoflipid were dyspnea, leukocytosis, diarrhea, pneumonia, cholestasis, dysgeusia, increased blood alkaline phosphatase, increased gamma-glutamyltransferase, increased C-reactive protein, tachycardia, liver function test abnormalities, headache, pruritis, dizziness, rash and thrombophlebitis.

The following adverse reactions have been identified during post-approval use of Smoflipid in countries where it is registered. Infections and Infestations: infection. Respiratory, Thoracic and Mediastinal Disorders: dyspnea.

To report SUSPECTED ADVERSE REACTIONS, contact Fresenius Kabi USA, LLC, at 1-800-551-7176, option 5, or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

DRUG INTERACTIONS

Coumarin and Coumarin Derivatives, Including Warfarin: Anticoagulant activity may be counteracted; monitor laboratory parameters.

USE IN SPECIFIC POPULATIONS

- Pregnancy and Lactation: There are no available data on risks associated with Smoflipid when used in pregnant or lactating women.
- Pediatric Use: The safety and effectiveness of Smoflipid have not been established in pediatric patients.
- Hepatic Impairment: Parenteral nutrition should be used with caution in patients with hepatic impairment. Hepatobiliary disorders are known to develop in some patients without preexisting liver disease who receive PN, including cholestasis, hepatic steatosis, fibrosis and cirrhosis (PN associated liver disease), possibly leading to hepatic failure.

OVERDOSE

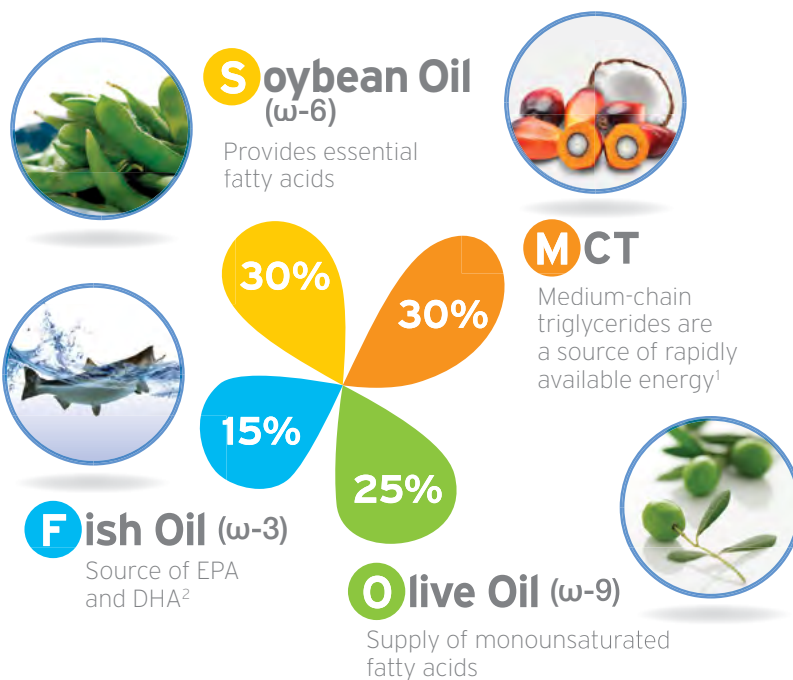
In the event of an overdose, fat overload syndrome may occur. Stop the Smoflipid infusion until triglyceride levels have normalized. The effects are usually reversible by stopping the lipid infusion. If medically appropriate, further intervention may be indicated. Lipids are not dialyzable from serum.

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SMOFlipid®

Lipid Injectable Emulsion, USP 20%

As an alternative ILE with four oil sources, SMOFlipid aligns with the most current SCCM/ASPEN guidance for COVID-19 patients requiring ICU care, which recommends limiting the use of pure soybean oil ILEs.¹



SMOFlipid is indicated in adults as a source of calories and essential fatty acids for parenteral nutrition (PN) when oral or enteral nutrition is not possible, insufficient, or contraindicated. **Limitations of Use:** The omega-6: omega-3 fatty acid ratio and Medium Chain Triglycerides in SMOFlipid have not been shown to improve clinical outcomes compared to other intravenous lipid emulsions. **Contraindications:** Known hypersensitivity to fish, egg, soybean, or peanut protein, or to any of the active ingredients or excipients. Severe hyperlipidemia or severe disorders of lipid metabolism with serum triglycerides >1,000 mg/dL.

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