

**FEMALE SPEAKER:** Welcome to Mayo Clinic COVID-19 Expert Insights and Strategies. The following activity is supported in part by an independent medical education grant from Pfizer, Inc. and is in accordance with the ACCME guidelines.

**ALEX NIVEN:** Welcome to the Mayo Clinic Critical Care Insights-- COVID Edition. My name is Alex Niven. I'm a consultant in the division of pulmonary critical care and sleep medicine here at Mayo Clinic in Rochester, Minnesota, and also the education chair for both our division and for the independent multispecialty critical care practice.

The COVID pandemic has changed the way that we practice, likely, forever. And the critical care community has been particularly impacted by the current pandemic. Critical Care Insights-- COVID-19 Edition is intended for health care providers who are caring for patients with COVID-19 across the world in the ICU. Best practices to care for these patients have been rapidly evolving. And busy bedside providers-- I know I have-- struggle to keep up with the volume of information, especially given that the information sources that have been providing it are frequently less than rigorously peer-reviewed.

In response, Mayo Clinic has developed and asked Mayo expert COVID-19 task force that have collected and curated the available content into a free, public website under the Mayo Clinic AskMayoExpert COVID-19 Navigator. This source provides basically a curated site for best practice recommendations in the care of COVID-19 patients developed collaboratively by an interprofessional stakeholder group of Mayo Clinic subspecialists.

And this information is continuously informed by rapid literature scoping reviews performed by the Kern Center for the Science of Health Care Delivery. This online CME course is designed to speed dissemination and implementation of these best evidence-based guidelines, best practice innovation, and provide discussion of ongoing clinical controversies that we face in critical care as we take care of these patients. These discussions will feature the original authors of the content that is available on AskMayoExpert, and allow them to discuss the evidence and best practices that they have used to provide these recommendations, and the why behind the information that they've shared.

We will be continuously updating this content as time goes on, based on the available high-quality evidence that comes through our rapid scoping reviews and our evolving innovations and evolution of clinical practices within our own health care delivery platform here at Mayo Clinic. This initial CME offering consists of seven lectures, including topics from intubation safety, infection control, workflow considerations, navigating drug shortages, maximizing team performance, mindset training for the individual, humanizing critical care, respiratory therapy innovations, among others.

We will continue to evolve this content as time goes on with new information on the epidemiology, virology, clinical features of COVID-19 patients, and also evolving recommendations with regards to testing and the care, in addition to infection control considerations in this challenging population. We hope that you enjoy this work. This information has been provided as a series of grand rounds presentations to our critical care community over the course of the last five weeks, and will continue to evolve over time. Welcome to Critical Care Insights. I hope you enjoy our work.

Good afternoon and welcome to Critical Care Grand Rounds. My name is Alex Niven, the education chair for the critical care independent multispecialty practice. It's a true pleasure for me to bring to you, as usual, a fantastic panel from our interprofessional critical care team. The topic that we're going to be talking about today is ICU Outreach from Mayo Clinic During the COVID Pandemic.

And I'm going to take the liberty just to call on folks to introduce themselves so that we can start off knowing this distinguished group that's around the camera here. Ogi, you want to go first?

**OGNJEN GAJIC:** OK. Ogi Gajic, medical intensivist from St Mary's Hospital here in Rochester, and Methodist Hospital.

**ALEX NIVEN:** Yue.

**YUE DONG:** Hi, I'm Yue Dong. I'm working as a research scientist in the METRIC group here in the [INAUDIBLE].

**ALEX NIVEN:** Ben.

**BEN DAXON:** Hi, I'm Ben Daxon. I'm an anesthesiologist intensivist here at Mayo Clinic, both out of the Methodist campus and St. Mary's campus.

**ALEX NIVEN:** Rachel.

**RACHEL:** Hi. I'm Rachel Hodny. I'm the operations manager for our eICU program.

**ALEX NIVEN:** Sean.

**SEAN CAPLES:** Hey, Sean Caples, pulmonary critical care and program director for the Tele-ICU program.

**ALEX NIVEN:** And Sarah.

**SARAH BELL:** Hey, Sarah Bell, nurse manager for our eICU program.

**ALEX NIVEN:** So I think it's fair to say that the COVID pandemic has been a disruptive event for everyone across the world. And we are certainly not immune to that here in Rochester. That being said, I think it's also safe to say that there are plenty of areas across the world who have experienced more disruption and more challenges in terms of the patients that we have confronted and the logistic issues that we have dealt with than we have here at Mayo Clinic.

And I wanted to start with Ben here, because Ben actually went to New York just a couple of weeks ago and spent some time in that environment, just to paint a little bit of a picture for us in terms of what it was like there for him so we can compare and contrast that to our individual experience here. Ben.

**BEN DAXON:** Sure, thanks. Yeah, as Dr. Niven said, I was in New York for a week, went as a volunteer, and worked at one of the overflow COVID ICUs. I asked what I could do to help out the most, and they said cover the nights, so I did.

For some perspective, lots of places have seen COVID, but not to the same degree there. I think maybe the biggest difference is just how relentless the virus was there. Just the influx of patients was enormous, and so one of the physicians I worked with had worked 19 nights in a row straight. I can't imagine doing that.

Almost every other physician I'd worked with there that was not a volunteer but who was just a regular clinician at the hospital had spent very few days away, very little time with their family. And they were just exhausted-- frankly exhausted. They had been doing it for weeks.

And I think maybe the hardest part for them was they didn't know when the end was or if it was going to get better or worse. So I think that takes a psychological toll on people. It's one thing to go through a pandemic and a surge and all that work if you know, I just got to hang on for x number of days because that's when it's over, and I get to go kick my feet up for a few minutes. They didn't have that luxury. And so I think the mental aspect of just knowing it was tough and it was going to be tough for an undefined duration was maybe the hardest part.

One of the other things that was also interesting to see was-- I'd previously spent time in the military and deployed. And you have surges of patients, mass calcs, things like that. But everybody there would train together before the deployment, and was on the same page. And they knew what they were going to do, and defined roles.

And those were still there, but they weren't to the same degree as when I would deploy with the military, because that group had been together beforehand and trained and knew stories about each other, were on good first name bases. But here, you had people coming in every day, like me, for example. I didn't know who most of the people there-- I didn't know who any of the people there were. They didn't know me. And then the next day, it's a different volunteer.

And so the lack of familiarity between everybody, I think, was also really hard. It made it difficult to provide good continuity of care. A lot of how we should care for these patients is up for debate. And I'm not going to get in any specifics on treatment regimens and drugs and whether or not they do or don't work. But when you have a lot of different people involved, nuances in practice start to show. And because people hadn't trained up for this together, I think it made it a lot more difficult to provide a unified front, so to speak, against the common enemy.

**ALEX NIVEN:** Ben, I know you're juggling the OR today, so I just wanted to ask one more question, because I saw that pager go off. Could you describe a little bit the practice environment that you encountered during the shifts that you were there, what a typical shift looked like?

**BEN DAXON:** So for me, a typical shift was 7:00 PM to 7:00 AM. I would take sign-up from two separate ICU teams simultaneously. We'd go around the unit as you normally would. And it was-- as most night shifts, you just hold down the fort until the morning sunlight.

We didn't have too many admissions. The way the hospital worked was they were-- my unit was an overflow ICU, and so the trend had started to come down. And so they weren't trying to admit any new patients to my unit because the hope was that as things continued to decline, they would eventually be able to close my unit. So I didn't take any new admissions. I just tried to hold the fort with what I had.

The team that I would round with was different every night. One night, I had six physicians rounding with me. The next night, I had three. One night was three fellows.

Another night was two fellows, a nurse practitioner, and then three board-certified physicians in various specialties. So I had a general surgeon with me, I had a urologist with me, and a cardiologist with me one night. So it was never the same team.

A lot of people lament that they're not critical care trained, and they felt like they couldn't go and help. And I was very glad I had a lot of non-critical care trained people, because I'm critical care trained. I feel comfortable with critical care. But I have a lot of questions about hematology and coagulation. It would be nice to have somebody with that expertise at the bedside with me.

I had a GI bleed issue one night. I just happened to have a gastroenterologist. I had 24 very sick patients. I just said, whatever you want to do is fine. We'll divide and conquer. So while it was a little difficult to have people who have been out of the ICU environment for so long, it was also really nice because I had some pretty easy curbside consults for them.

**ALEX NIVEN:** And I think just to echo back something that you told me before, this was essentially an open unit. So you put your PPE on at the beginning of the night and wore your PPE throughout the night. And I think you've still got some of the marks here to prove it.

**BEN DAXON:** Yeah. Yeah, that may be from the PPE I'm wearing today. So it was a giant room with just curtains dividing patients. There was no door to shut when you were going to do an aerosol-generating procedure. The mask was on continuously. PPE was on continuously.

After the week was over, I actually grabbed lunch with a friend, and I took my mask off. I was actually bleeding down my nose when I went to go take a bite of food. I didn't realize it had gotten so bad. But the sense that the coronavirus was all over you all the time was constant. There was no way you could keep strict adherence to donning and doffing when you were going in and out. I'm sure we made lots of missteps.

Of course, we tried our best. We tried to follow our protocols as best. But in the environment, it just wasn't-- I would hate to have had JACO watching us with all of our donning and doffing. I'll just put it like that.

**ALEX NIVEN:** Well, thanks for sharing that experience, Ben. I think it paints a good picture for, I think, what other practice settings have been challenged with over the course of this time.

So Ogi, when it comes to our outreach from the enhanced ICU, this really started with you, right? So can you tell us a little bit about how you made the connection with your friend in New York?

**OGNJEN GAJIC:** So I did my internal medicine residency in Brooklyn, New York, and junior to me, when I was a third-year and a second-year resident was Stan Millerman, who turned later to be a pulmonary critical care physician like I am, and is, I think, division chair at Lawrence Community Hospital of Lawrence Presbyterian system.

And so he called. I don't remember exactly which day. It was like the first week of April or the last week of March. On a Saturday morning, I got a text from him, or a call. I don't even remember. Maybe it was an email with his cell phone number, knowing that we have the CICU program, and if there was a way that we could help in one of these ICUs similar to what Ben described, overflow ICUs that they had. And they had difficulty having intensivist staffing there.

So it was Saturday morning. I was off. I called him back immediately, and he explained the situation. And I think I texted or emailed Sean five minutes later. And I was on call with him and also with Brian Pickering, I think, within 10 minutes of that first email I got.

So I don't know-- Sean immediately said, let's do it. So I got back to Stan, to Dr. Millerman, and said, OK, we are in. Tell us what we can do. And just in general sense, he explained that they had different practitioners, but really no pulmonary critical care physicians anymore available due either to being busy with their patients in other ICUs, being on a leave, being exposed. There were really short-staffed, so anyone in that hospital system was attending to these patients.

So I think this is really all what it was, just a friendship from residency and our ability to respond well. And I will let Sean explain, and Sarah, and others how they did the medical, because the next I know, on Thursday-- so that was Saturday-- next Thursday, we have already been in-- Sean Caples was doing the ICU, attending on morning rounds and on evening sign-out in that ICU, I think, within six days, fully licensed in New York, temporary, with hospital privileges.

**ALEX NIVEN:** So Sean, if you could maybe pick up the story from your perspective, when you got that call on Saturday? And then I think for some of our audience, the role of the enhanced ICU, the scope of our practice, and what it usually takes to stand up an enhanced ICU relationship with an outside entity are all sort of open questions. So if you don't mind starting, and then passing things over to Rachel and Sarah when you feel it's appropriate.

**SEAN CAPLES:** Yeah, perfect. Thanks. Is the audio a little better? Good. Yeah, thanks, Alex and Ogi. Ogi really was sort of the driver that weekend of thinking a little bit differently about how we can deliver care through tele-ICU. And we knew what was happening in New York several weeks prior.

I think we were all believing that it wouldn't be possible to roll out something, a model that we were accustomed to with our traditional tele-ICU. And that sort of thing is a pretty complex process takes several months to get up and running. And so we really had to change the way that we thought about delivering care.

And I knew that weekend that we just had to pivot and think differently. And so I brought it to the team-- Sarah, Rachel, and our IT folks-- and just asked what could we do. And I'm going to turn it over to Sarah in just a minute, but I wanted to just show a schematic here.

So this is a schematic of what the overall process looks like. And it turns out that the folks at University of Pittsburgh, there was another process happening independent of what we were doing. And actually, I think Stan Millerman at Presbyterian heard what was happening with Pittsburgh at another hospital that was part of the Presbyterian system. And that sparked the idea to reach out to Ogi.

And so two processes were occurring in parallel and independent of each other. But we've come to find out, after the fact, that what Pittsburgh was doing and what we were doing were actually very similar, both the technology and the processing model. And so this schematic just mentions the physician piece, the nursing piece, the IT piece, and the operations piece.

And really, the only way this was going to be accomplished was to have a champion on the receiving end. And for us, that was Stan. And he had a full vision of what this could look like, and it well aligned with what we could offer. And I think that's really the only way that you could pull something like this off, because he was really the connection with all of the providers on the ground there.

The other piece that was critical was the operations and information technology, not just here in Rochester, but also there in New York. And they had the resources of the entire New York Presbyterian system. And so they had a lot of people devoted to COVID and these sorts of initiatives. And so we were able to leverage all of those resources as well. And you probably couldn't pull this off at a hospital that was smaller and less resourced with both IT and physician champions.

So I'm going to turn it over to Sarah for the next few slides, to talk about the discussions that were had with the operations team and the IT team. So Sarah, I can advance these slides for you.

**SARAH BELL:** Sure. So we basically fast-tracked what Rachel typically does over a nine-month to one-year process of licensing and credentialing over a matter of days. And a lot of that-- [INAUDIBLE] will tell us why-- was that CARES Act that allowed the breathing room for institutions and states from a licensing and credentialing standpoint.

But we had a project manager assigned to us from New York Pres. And we met all hours of the day, evening, to figure out what this process was going to look like and take, as Sean was saying, a robust eICU program and turn it into a just-in-time telemedicine service and try to make it easy enough for a group of providers who might not have even stepped into our eICU before to be able to function with the technology, with the local team.

So when you're going live with an eICU program, everybody needs to be licensed in the state because you're considered to be caring for patients in that local location. So you have to be licensed by the state you're providing care in. And then you need the facility credentialing. And you can go to the next slide.

So the CARES Act, in the declaration by the president of the state of emergency we were in, allowed us and CMS to waive provisions that are normally needed for telemedicine services. And typically, when we're going live with a program, we have an extensive contract, malpractice-type things that are talked about months in advance. A contract can take anywhere from three months to nine months to a year, even, to iron out details. And a lot of that is related to liability and malpractice and things like that.

So the CARES Act and the state of New York allowed us to not have any of our normal provisioning done for telemedicine services. And we were able to come to a simple agreement that waived everybody of liability. We were there for the emergency, so our providers were not going to have any level of liability or malpractice associated with our help there.

And then CMS also deferred staff licensure, certification, and any registration needed at the state level. So normally, you have to apply for your license, get fingerprinted, do all that process. None of that had to occur. And it really was our providers who were going to be volunteering, filling out brief credentialing paperwork, and providing some letters that they are competent to provide care. And we were up and running.

Rachel and myself and Sean, and then our IT team, we worked many hours into the day and evenings to get this stood up. But it was for a purpose a goal. We felt that the end goal was going to provide a huge benefit to them.

And when we first actually got on the phone with them on day one-- so the Monday after-- they couldn't stop saying thank you for even taking the phone call. So even if we couldn't have gotten this stood up and running, they were just saying, thank you, thank you, thank you for even just the opportunity to have a phone call.

So you can go to the last slide I think I have. So we normally connect with an interface tunnel, a VPN kind of tunnel going between us and the facility that, again, can take months to set up. And what we did this time, for this kind of emergency purpose, we accessed just their EMR. We utilized a video service they already had stood up throughout the organization. And then we piped over the ECG viewer.

So from a rudimentary level, you could go through the patient's EMR, logging into it through a Citrix environment. You could see the patient, and have a conversation with the local team. And then you could keep their ECG viewers up in the background as they were doing their workflow.

**SEAN CAPLES:** OK. Thanks, Sarah. Here's a picture of that video technology, just using an iPad and rounding with the team. So we modeled this as joining the team on AM rounds, and then again for a quick run the list in the PM 12 hours later to support the team going into the nighttime.

And so we brought in Kristen Cuda from pharmacy to help with reconciliation of medications. We learned a lot about management of the COVID patients, the thrombophilia associated with the disease. A lot of the patients were prophylactically put on things like apixaban, or Coumadin, or low-molecular-weight heparin. There was a lot of hydroxychloroquine and other drugs, preemptively.

And so Ogi's CERTAIN Checklist was also critical in the rounding process. I think it really brought the culture of the ICU to a place that was really in chaos because of the sheer numbers of patients. And so we were able to bring a little bit of order to rounds with the checklist.

I think right away we could see, on day one, that our input was valued and was helpful. And I think people on the ground really appreciated that. And I'll stop there, Alex.

**ALEX NIVEN:** And I also want to turn to Rachel here because I think it's no small tour de force to put all of this together in the short period of time that you did. I think as physicians, we sort of walk up to the monitor and say, great, we're ready to go. And we don't realize just all of the back work behind that.

And so Rachel, would love to have you comment on your perspective and your experience with this and how you found an amazing set of efficiencies here.

**RACHEL:** Yeah, so first of all, I think a piece that-- just to tie into the story with Ogi and Dr. Caples here of the speed of this. So I think my inbox, [CHUCKLES] after Dr. Caples sent out the initial ask for volunteers, was inundated. I couldn't even believe the people who had responded within minutes, saying that they were willing to volunteer and do whatever they can. And so my first task was taking all of those emails and then looking at when people were available so that we could start putting together a schedule, prioritizing how do we go about getting people access, and doing the privileging, and that sort of thing.

So it was incredible. And unfortunately, a lot of people who volunteered, we didn't even get to have a chance to help out. But I just want to make sure that I mentioned that piece of it.

I think another piece is the entire team having the attitude of we can do this and we'll do whatever is needed, and not putting any roadblocks or any barriers in the way of what we know from the traditional sense of doing this, and the long timeline, and all of the things that are involved. Really, it's doing that can-do attitude of, what do we need to do? And how do we make this happen? And who do we need to reach out to?

And again, I think the fact that they had already done this, and so they already had a COVID contract in place that we were able to quickly just amend and get up and running, that they were already familiar with the process for doing this expedited privileging process, and were able to respond very quickly when we would give them a list of who the providers were, and the information they needed, and to turn that around very quickly.

Yeah, I don't know if there's anything else that I'm forgetting. I mean, it was just so fast [LAUGHS] how everything came together. And I just kept-- with my emails. As we said, we were doing it all hours of the night. And I'd wake up in the morning, and I'd just right away get going because they had already responded to the things that we had sent to them to keep moving. So yeah, it was quite amazing how quickly everything came together.

**ALEX NIVEN:** So I would imagine there's a fair amount of temptation, seeing how successful this pilot project was, to say, well gosh, we should do more of this. And I'm also going to hazard a guess that given the rapidity with which all this was rolled out, not everything was perfect in terms of the experience. And so I guess I wanted to ask any of you lessons learned or big takehome points that you would apply to the next time we're called on to do something like this.

**SEAN CAPLES:** I guess I'd have to think about that. I don't know that there were any technical hiccups or operational hiccups. I guess there was no timeline going into this. It ended up sort of petering out as the situation on the ground stabilized. And I think at that point, we were careful not to be intrusive on the environment and the culture there. But no, I think expectations were such that whatever we could do, it was accepted and appreciated and valued. And so I think it went about as well as it could have.

**ALEX NIVEN:** Yeah, I think that's incredibly important when you think about a situation like this. You're there to help and not to take over. And it sounds like that's exactly the right balance that you guys struck. Rachel or Sarah, any other lessons learned from your standpoint?

**SARAH BELL:** I think from mine, I think the challenges are, as you said, Alex, what we can do and timelines. My typical eICU launch is a year. So the fact that this was less than seven days may give Rachel heart palpitations from an operational standpoint. But it kind of shows what we can do when we're needed.

**ALEX NIVEN:** Yeah, well, it's a tremendous accomplishment, and you guys all have something significant to be proud of there. I'll just interject for a minute before we shift topics here just a little bit. As usual, the Slido question stream is open, so that is available either through the link at the bottom of the video exchange where you're watching, or through the QR code on the grand rounds invitation that was sent out yesterday. So please feel free-- oh, we just had a patient that popped up. And this question was, how many patients, on average, were placed in the prone position of the patients that were on the ground? Ogi, maybe I'll ask you to answer this question, since I know you did a substantial amount of time and coverage. And I know Sean needs to step away here shortly.

**OGNJEN GAJIC:** Sure. So in this ICU in Lawrence Hospital, they were limited by the resources. So prone position was not like for everyone and all the time, so they were very-- and depending on the night, the staffing was available to turn patients prone who would be otherwise eligible. And in our eyes, she would have turned prone.



On other nights, we just could not do it. It wasn't safe. So we had resource constraints on many aspects of care. And obviously, as with all of this, as Sean said, we've learned a ton of how to-- it was really a learning experience for us, how we would have handled this situation if it come, because at that time, we didn't know if it was not going to be like that at Mayo as well. So it was really a learning experience.

But in regards to everything, from medications, spontaneous breathing trials, choice of sedation, we had many, many constraints. And still, the basic critical case is critical care, so systematic approach, getting through organ systems, making sure that you avoid central line infections that were rampant when we just got in.

Obviously, Kristen has done a fantastic job by getting the pharmacist into the loop with medication reconciliation. It was very helpful. So it was really a two-way street. We've learned from them, and they really appreciated all the help that we could provide.

**ALEX NIVEN:** I think there was another question that just popped up in terms of whether or not this is still going and opportunities to increase this effort. I know that, basically, as this just-in-time ICU subsided in terms of demand and patient volume, you all brought this project to a close within the last several weeks, I think. And my understanding is right now there's no current plans to engage in other activities. Is that right, Rachel?

Well, what I'd like to do in the interest of time is turn the page a little bit and talk about another outreach effort that Ogi and Yue have been integrally involved in over the course of the last month and a half or so. And Ogi, maybe I can just ask you to set the stage a little bit in terms of how this got started again. And then I know Yue, you have a formal presentation that you'd like to provide. So Ogi, how did how did this opportunity come up?

**OGNJEN GAJIC:** So as many of you know, I am originally from former Yugoslavia, Bosnia. I came here after the war there. And as I got trained in critical care, over the years, I tried to give back and help set up some of the intensive care capacities in the countries that inherited Yugoslavia. So Bosnia, Croatia, Serbia, Slovenia, Macedonia, there are like six countries now from that large country that I grew up with.

So they were part in our CERTAIN program that we've done around the world, that you will talk about it. And we did some tele-education, not really telemedicine, over the past several years. And in one of the hospitals, they are providing help and getting them up and running with the medical ICU capabilities. Usually, over there, care is done by anesthesiologists who are not critical care trained. And medically critically ill patients have limited access to intensive care in Eastern Europe and Asia, in general, compared to the United States.

So that was the-- so we have had ongoing collaboration with the region. And then World Health Organization office from my hometown in Serbia reached out to me, I think, third week of March, or second week of March. They knew about this effort which we've done over the years, and they asked, is there a way to help them get ready for the pandemic which was imminent and to high extent there?

And maybe the program that we were doing through tele-education and all of that CERTAIN effort that we have done, somewhat similar to what has later happened in New York, can we do something more on an organizational basis? And they were willing to make a contract for it, so we sat together, Alex and I and Dr. Dong, and we felt that we could provide that service. We also wanted to learn, too, from people who are going to get this before Mayo Clinic, and to provide support like everyone else. So really, that was it.

And then when we put the budget together, what was needed to provide-- arrange it-- and Yue will tell it-- the website, educational materials, weekly tele-education sessions, and social media community, the WHO, I think, within a day, they responded and said, we want you to start now. And that's really how it happened.

**ALEX NIVEN:** So Yue, we've talked a lot about CERTAIN, and I think you're planning to give us a bit of an overview of that, and then a little bit more of a detailed description in terms of how this project then evolved because, let's face it, you were the person running most of that in terms of the logistics and setting things up. So let me pass things over to you.

**YUE DONG:** So I think a lot of you may have heard about CERTAIN. CERTAIN is a Checklist for Early Recognition and Treatment for Acute Illness and Injury. This was a project. I think we started about six years ago, 2013. So we started here. Internally, we tested in the Sim Center. We deployed in the last six years for globally to testing the relevance through a clinical trial.

So you can look at this map. So [INAUDIBLE] the CERTAIN includes three components, including admission, [INAUDIBLE] checklist, a running checklist, and any [INAUDIBLE]. [INAUDIBLE] mentioned about the previous slides, also, we included the patient-centered care, [INAUDIBLE] more for humane communications.

And I think this is delivered either through software, mobile apps, or even paper versions. And so in the last six years, we were able to deliver this program in 15 countries, globally, in 55 ICUs. Actually, we collect data from 34 ICUs, so we prepared the data for publication. Actually, the early data is showing that through this remote communication tele-education program, we are able to change the process care through the reported surveys, and also the [INAUDIBLE] of [INAUDIBLE] use hospital, and also mortality. So this paper in discussion-- is a mission.

So after that, we said, through this low-cost remote two-way communication, we are able to support clinical engagement from [INAUDIBLE] ICUs in large-scale settings. I think this is really the lesson to learn. And the next step, actually, we further expand this program to one hospital in Bosnia until Dr. Gajic mentioned [INAUDIBLE] detail almost two years in a weekly remote coaching program with one of my ICUs, including [INAUDIBLE] nurses, the whole team, for rare case studies, and case discussions. And of course, there'll be some patient identification product [INAUDIBLE]. And also, this state actually published all this data showing that improving the care and reduced costs [INAUDIBLE] less in state.

So when we got this call from the COVID-- a call from WHO, we think we can easily to convert this program to supporting larger scale engagement for those countries. This is the figure. You can look at in that region. Those cases were really also very, very high the last couple of weeks.

So basically, this is for the high-level structure. We're using various technology tools. We're using Zooms like we did right now. So for [INAUDIBLE] discussion from multiple experts from those regions, including physicians, anesthesiologists, and pulmonologists, and infectious disease specialists. And then those are doing the panel discussion and using the Zoom skill. And streaming this to YouTube, then we can [INAUDIBLE] broader engagement from the viewers for that country, and that area.

And also, we developed that website, including the local language, helping to offer the asynchronized approach to watching those materials online, download this checklist, and also the guides, how to create a communication platform through Viber. Viber is through the primary tool, including the 2,000 membership communication groups. And also, we're using surveys to collect data regarding their feedback.

So look at this group we're in. I think we have, total, 2,000 members. There's very active engagement. You can see people share documents, share links, and photos, also including communications on the asynchronized matter.

And this is really one of the discussions we had weekly. And over the last couple of weeks, we're streaming this too. People can watch it online on different times, so if they cannot watch on real time.

And this is a website we developed for CERTAIN, so at [certain.org](http://certain.org). You can check it out. And we were launching it right before this COVID happening. Also, we developed a local version, so this is helping people engage much more easily.

After that, we're using one of the analytical tools from YouTube. We can see the actual total engagement is very high. So over the last couple of weeks, there's a total 2,000 hours of viewer for those videos in the channels, for those total six of the video sessions. And each session average, the viewer spend at least 15 minutes.

And more interesting, also, we can look at more detail for those data. You look at this pink data here. So 80% of the people watching those videos on mobile devices. This is really interesting because, apparently, mobile is very important part of this engagement, rather than stay in the computer or desktop. So this is really-- we are leveraging this technology. We're able to reach people on their convenient time.

And same thing, we're also tracking the engagement that people visit our site. And there are a lot of people using mobile as well, so using them to access the website, total 1,000 views for website, and from various countries, those that data we can track. This data help us to engage in our-- design our program further in the future engagement efforts.

Also, we did collect data, so we asked people what their overall rating for our course. I think that you can see 67% rated Excellent, and 30% think it's Very Good. And also, more than 90% recommend this to their colleagues. So we are very happy for those survey results that came from these groups.

Subsequently, I think this important lesson we learned through this journey, we have to be very eager to engage in this dynamic environment. We were able to use in those technology, helping facilitate this discussion.

And also, very important, through this channel, we are building relationships. I think, over the years, we are working with those local hospitals, CERTAIN hospitals. They are really also a part of this communication, partners, working with us together. Those are the names mentioned from the programs. They're leaders in the regions, and from Mayo's site. Ogi, let's come back to you. Anything else you want to add?

**OGNJEN GAJIC:** So maybe you can put the video that this was-- you can put this in? No? Just go back. There was this virus. So just interestingly enough, the part of this-- this effort also led these centers to be among the first outside of the United States to join the SECM virus study.

So we can see the dots in the Balkan area, which I'm quite proud of. So not only did they receive the education. They're giving back by entering data so we can all learn about this disease. And these are difficult data to enter. It's like a 40-- several hours per patient state through all of this. So I'm very proud of that.

Just to put a context here, 20 years ago, there was a war there. And these countries were actively in war with each other, different regions and ethnicities there. So what happened today if 20 years from now you would have a educational initiative in Syria among all of the fractioning parties, so that's how bad it was 20 years ago. And now they all got together around this common enemy and worked very hard to cross all the barriers that otherwise would not have happened then. That's really interesting.

And then the effort, although mostly for intensive care part, had a reach far beyond that because this became very famous and popular, with such a quick setup and engagement of so many physicians, like over 2,000 physicians from the region, and all the experts who are physicians, anesthesiologists, and otherwise around the world. So we were able to provide correct information to otherwise a lot of fake news like everywhere, that this is a real problem. And we may have influenced, through media appearances, the behavior of the population there, which saved them from being much less hit than neighboring Western European countries like Italy, France, and others. So this was very timely.

And Yue, maybe you can put this, just to see how it was actually. This is actually the-- on national news, there was a quick interview. And then they showed what we were doing. Yue, you want to show that, maybe?

**YUE DONG:** Yeah. Yeah, just a second here.

**OGNJEN GAJIC:** You don't have the sound, but it's with the music. And anyways, that was the expert from our discussion, so these are experts, different specialties from around, discussing the case an hour weekly. We go through CERTAIN, by systems. And this was picked up, and I think this video was viewed like within two days, with 100,000 views, which was politically important to help the epidemiologists and public health take this seriously, so really fascinating effort there.

**ALEX NIVEN:** Sorry. I think it's probably worthwhile mentioning the Viber stream that you used. We were just looking at this information yesterday, and it was over 210,000 impressions in terms of people that opened up that content and looked at it in some way, shape, or form, so a pretty impressive effort.

And Yue, although this wasn't necessarily within the scope of this conversation, you did something very similar using social media in China, correct?

**YUE DONG:** Yeah, I think the way we ought to think about this, this program can be replicated in many other places. I think that one of the work really early on with some clinicians in China regarding this COVID as well, so yeah.

**ALEX NIVEN:** So I'll just remind folks that the Slido chat is still open, if there's questions that people would like to ask. I think one of the things that always comes up when you talk about technology and medical care like this is where the boundaries are, the limits, and what security issues there are in terms of confidential patient information and HIPAA requirements.

And I guess I think I would be irresponsible not to bring that issue up with this group because, certainly, these are amazing accomplishments with just-in-time efforts leveraging our technology. But I would imagine, there's also some pitfalls that we need to caution people about, should they start thinking about pursuing various similar avenues.

So I guess maybe I'll turn to the enhanced critical care folks here first, because I know they've spent a fair amount of time thinking about this space, and compare and contrast some of the things that we've experienced in these two separate endeavors.

**RACHEL:** Sure, I can take that one. Consent is kind of something-- is an ICU program that we tackled right away in that patients don't have to consent to our service. And from a legal perspective, we're consider a value-add as part of the care team. So in terms of liability and things, if we're making decisions for patients at other remote locations, our liability, unless we're egregious in our decisions, is relatively low because we're enhancing the care that the patients are receiving.

And typically, as patients learn about who we are and what we're doing as part of their care team, they feel it's a value-add as well. On a rare occasion, patients are very adamant that we don't get involved. And we'll respect that, unless they're being put in some type of danger. But in general, most patients feel a sense of security that there is another level of care and support for them.

**ALEX NIVEN:** And then you had mentioned the issues of a VPN tunnel and things along those lines. How does that all work? And what's the level of protection it provides in terms of confidential patient information?

**RACHEL:** Sure. Our network security folks are very smart, and they work tirelessly to ensure that we are protected from a hacking kind of scenario. And I'll use New York as an example. But if we don't have a VPN tunnel-- we did not have a VPN tunnel with New York-- one way to protect and make sure that if Sean Caples was logging in, it was really him, we used what we call two-factor authentication.

So just like you're VPNing from home, you have to provide, with your cell phone, the password, and enter it on your computer, we had to do similar security with them for a two-factor authentication so that when Dr. Gajic or Dr. Caples logged in, the system was confident it was them, and there was an interaction there.

When we talk about our other external clients where we have a VPN tunnel, that's our network of colleagues on both ends actually having a secure network chain between here and the location that we're providing care. So it's secured and unable to necessarily be hacked. But that level of security takes time to set up, and it will eliminate the need for this two-factor piece so that, as a provider, you could just log in from one of our computers in our eICU. You can do it from home or anything like that.

**ALEX NIVEN:** So I want to compare and contrast that, Ogi, with really the tele-education program. So we've talked here about both telemedicine and tele-education. So what are the boundaries? What are the limits? And what are the things that you have to be careful with when it comes to mixing tele-education with direct patient care issues? How did you manage that during these conversations?

**OGNJEN GAJIC:** So first, obviously, COVID pandemic has made these things different than others. So the priority was the right information at the right time. And to that extent, some of the world view on everything was relaxed during the pandemic, and I think appropriately so. So rather than keeping it closed with some passwords, we let these tele-education sessions to be broadcasted publicly on a YouTube channel. And we disabled chat so that someone would not put some crazy comments on YouTube.

With regards to Viber community, I basically managed it. So if something was showing up-- immediately, people started showing x-rays of patients or something, I just basically deleted those and explained that this forum, although it's closed-- Viber is more like WhatsApp-- it's still not to be shared. We don't want to see actual patients' information ever.

These are all hypothetical patients. So when we go through educational session, we are not discussing the real patient. We are discussing any patient through the systems that comes with COVID, not any specifics. So that was quite explicit. And on our disclaimers, with CERTAIN educational materials, Mayo Clinic, I, you, or Yue, we never take any responsibility for the educational materials. These are to be used by local physicians who are in the context that they care. They may decide to use this education, what they've learned, or not based on their best judgment.

But this is not telemedicine. And it's different from what was done in New York, and in regulatory legal terms and others. So it kind of was under this FOAM, Free Open Access Medical education that has been, obviously, popular over the last decade through proliferation of online resources.

And in a setting of pandemics, the further you can reach was more important than any potential risk. But we manage that risk and, as I said, for that Viber community, I actively deleted-- first warned the people, and then if they didn't comply, I deleted their posts.

And no one had to be banned. But we said, if I have to delete it twice, you're going to be out of the community. So I was a so-called super administrator, I guess, like people on Facebook and Twitter for this 2,000 people community. But they're all physicians, and they all-- or I think 95% were actually physicians-- so the risk was lower than on a public platform like Facebook or Twitter.

**ALEX NIVEN:** And I think maybe I'll just echo from my limited experience with the groups. For me, the experience was a group of physicians talking about common issues and challenges that they were facing, and sharing their practical experience and understanding of the current available literature, which given the deluge of content with variable peer review, I think it was an incredibly valuable exercise to sort of vet and provide some thoughtful peer input in terms of how to interpret those experiences and in those data that came up with respective topics. Yue, I'm sorry. You were going to say something.

**YUE DONG:** Just add one more thing, so I think also we got support from the Mayo CPD office. They helped us and guide our general approach, make sure we are complying the Mayo rules, the branding, the right application, make sure we are aligned that visions, because Mayo have very good group, international global education program. We are working with them very closely in the last couple of weeks to make sure we are aligned with the Mayo branding strategies.

**OGNJEN GAJIC:** And what was good was also that this was WHO project, so it was endorsed and asked for and contacted by the World Health Organization office. So we obviously had to comply with their requirements. But we're also protected by that it wasn't some Ogi Gajic from Mayo Clinic, or Alex Niven, or Yue Dong who wanted to do this out of a mold. This was official program which leveraged the power of the institution.

**YUE DONG:** Organization, yeah.

**ALEX NIVEN:** And I'll just mention that Ogi and Yue have also been instrumental in terms of putting together several CPD activities, so the METRIC 2020 Virtual Critical Care Conference is something that's live now and basically free for anyone, unless you're looking for CME that was sponsored with Mayo CPD.

And then we've been working to convert these with AskMayoExpert COVID

Navigator information because, quite honestly, many of these discussions that we've been having have paralleled content on our COVID Corner, that has now been turned into AskMayoExpert content.

So there's another question that just came in in terms of who and how is all this paid for, including personnel costs and time. And I'm pretty sure I know the answer to that, but I'll just turn that to the group in terms of how these costs were covered.

**OGNJEN GAJIC:** For WHO effort, it was contract piece, so WHO paid for US time and effort and the technology part.

**ALEX NIVEN:** And Rachel, how about on the eICU side?

**RACHEL:** Specifically for the New York piece, obviously, the biggest bulk of what our cost is is the resources for the physician, his time. And this was completely voluntary, so there was no costs there. So it was really a free service that we provided.

**OGNJEN GAJIC:** We visit on our days off, basically. And Sean and I and others, we did it when we were not-- when we were off. That was all on weekends and on days that we are off our regular duties.

**ALEX NIVEN:** No, well, thank you very much. So by my clock, we have just about a minute or two left. Any takehome points or other things that people wanted to highlight before we sign off?

**OGNJEN GAJIC:** It's a two-way street. We learned as much as we provided, so it was very beneficial to me and to Mayo Clinic, both in the effort to WHO, and in effort to New York. So when we were, and if we were--