COVID-19 in South Asia - A Practitioner's Workshop

Transcription begins

Mittal Institute: We are live. All right Rajani, over to you.

Rajani Bhat: It's Satchit.

Mittal Institute: Oh, actually Satchit, if you're there to start.

Satchit Balsari: Good evening everyone. Welcome to the first of the series of informational seminars being recorded and hosted at the Harvard Lakshmi Mittal and Family South Asia Institute, in collaboration with Lancet Commission on Re-imagining Health Systems in India, and with the Community Science Alliance in India as well.

Satchit Balsari: We are hoping that this will be a free discussion between practitioners, initially starting with India and then South Asia, and hopefully with other countries, with resource poor settings where we can exchange up-to-date information, to counter both, the widespread misinformation around the management of COVID-19 but also to understand how best to take state-of-the-art science and apply it to the realities of the infrastructure and personnel that we have access to, in our various settings. So without much ado, it is my pleasure to invite Dr. Rajani Bhat - a pulmonologist based in both, Bangalore and Delhi. Rajani also knows several hundred million of India's 1.3 billion people as colleagues and I have recently learnt. And so, Rajani's invited some of her colleagues here and we have Dr. Sonenthal from Brigham & Women's joining us too. So over to you, Dr Bhat.

Rajani Bhat: Thank you Satchit. So, a very warm welcome to all of our guests in this inaugural session of the practitioner's workshop on COVID-19 in South Asia. The science and practice of COVID-19 clinical management has been constantly evolving over the last year and a half, and it's been a challenge for practitioners on the ground to keep up with the changing evidence, evolving evidence as well as for scientists and researchers to continue to receive information from the ground that would help them to study different patterns and treatment modalities. So, part of the challenge has been just keeping up with the sheer volume of the evidence as it appears and to implement it at the bedside. And clinicians and researchers from around the world have collaborated and have shared the local knowledge and emerging pattern of the virus and the disease as it evolves. And to help practitioners pass through this large volume of literature, but sometimes with contradictory conclusions, we're hosting this series of discussions which we hope will bring clear voices that speak to the evidence but also speak to how that can be applied and contextualized to settings with limited resources. So our speakers today have a wealth of clinical experience and they've played a key role in initiatives at their own institutions in generating practical, effective, evidence-based guidelines and protocols.

So to that end, today we have Dr. Paul Sonenthal who is the Associate Director for Inpatient Medicine and Critical Care at Partners In Health. He is a Pulmonary and Critical Care Physician at Brigham & Women's Hospital. And we also have Dr. Richa Gupta, Professor and Head of the Department of Respiratory Medicine at the Christian Medical College Hospital in Vellore. A very warm welcome to our speakers today and we thank you for taking the time to share with us your insights as we begin this first part of the series. And today's discussion will be on oxygenation and ventilation at home and in the hospital. We've seen a crisis developing across the world. There are many countries that have been hit with shortages and COVID-19 has revealed the gaps in healthcare infrastructure in many countries. There's a lot that we can learn from what has passed. The challenge continues to grow in other parts of the world across South Asia, Africa and South America. So the sessions today we hope will help practitioners in implementing the best of

science, keeping in mind resources and learnings from other countries. I'd first like to invite Dr. Richa Gupta to share with us her insights and their team's process in developing the guidelines and what they feel was the most effective way of managing oxygenation at home and in the hospital. How have the guidelines evolved, how has the evidence changed and emerged to guide our practices in India and South Asia, so Dr. Richa Gupta.

Richa Gupta: Thank you Rajani. Am I audible?

Rajani Bhat: Yes, you are.

Richa Gupta: Am I audible?

Rajani Bhat: Yes, Dr. Richa. Please proceed.

Mittal Institute: We might be having slight connection issues with Dr. Gupta.

Richa Gupta: Hi, I'm really sorry for the bad connection here. Am I audible now?

Mittal Institute: Yes, you are. Dr. Gupta, if necessary feel free to turn off your video. The most important thing being that we can hear you and your insights.

Richa Gupta: Yeah, that's right. Sure. So, thank you Rajani for introducing me to this Alliance as well as giving an opportunity to be a part of this panel. Greetings from Christian Medical College Hospital, Vellore, India. And yeah, we did have lots of, lots of patients and at a point we had around eleven hundred patients in the hospital and it was really difficult you know, to cope with those numbers, but somehow yes, now, we're at a bit ease. So, oxygen is probably the commonest drug which is used in the care of patients who present with medical emergencies. Right from resuscitation to inhalation therapy. Now, when we talk about this COVID pandemic which ensued in December 2019 and slowly it engulfed the entire world in early 2020. And then the second, third wave, they're still continuing in 2021. The whole world almost came to a still. Everyone looking at scientists, researchers, clinicians, institutes all over the world put their heart and brain as to what could be the best treatment for this infection and how can we save the mankind. Various clinical studies were conducted and many are underway to study various new as well as repurposed drugs to treat COVID-19. And right now, till date, if we talk about the evidence-based treatments or strategies which have proven beneficial for the favorable, clinical outcomes in COVID patients, we have only few fingers to count with - oxygen, steroids - of course steroids are not for all the patients, and then there is awake self-positioning or proning, and few others with conditional recommendations like Tocilizumab etc.

Now in the current pandemic we know how important oxygen has been. It is probably the most essential drug and it is very important that we know what are the indications for its use, what are the safe practices and what we should not do. Not very late but whopping numbers of COVID patients amounting to about three to four lakh a day in India, about a month back. The whole country was crippled with acute shortage of oxygen leading to untimely deaths in many patients as well. Hence it became very important, wherever we are in a small set-up or a large set-up that not only do we know when and how should we use oxygen but also, how do we use it judiciously. So, for COVID-19 disease do all patients need oxygen? The clear answer is no.

So who are patients who will need oxygen and with this comes the important aspect of monitoring. So once diagnosed you have COVID, based on your symptoms, age, co-morbidities and your oxygen level, physician may decide to keep you either in home isolation or in a healthcare facility. So the pulse oximeter right - a small device, it comes very handy to monitor the oxygen levels. This can be used at home with ease and I'm sure many of the households will be having one by now. So of the many industries which have flourished during the COVID times, the

one making masks and these pulse oximeters certainly will be among the top, who have flourished. While at home isolation, so we at CMC, what we did was this time in the second wave it became really difficult to cope with the numbers of patients we were getting. So unlike in first wave what we did was, we didn't admit patients who were not requiring oxygen. So mild or asymptomatic COVID were actually kept at home isolation and they were given home-isolation packages and you know the instructions, and a nurse was there who used to call them morning and evening asking about their wellbeing. So this package which was given to the patients, it was carrying a home pulse oximeter, as well as a thermometer and a few paracetamols, that's what. So while at home isolation, it's very important to keep track of your saturation for about, we used to say, for about four times a day. Now monitoring saturation at every hour is not going to help except for increasing the anxiety and apprehension. It is also important to check the saturation correctly. A single reading of low saturation should not send one in panic. That was the, you know, we used to tell the patients, that do not panic if you have just a single reading of low saturation. The saturations should be more than 94% at home and if it's below this number consistently for sometime, then it should be a cause of concern, requiring to seek medical advice.

Now what happens, what do we observe, at times, the saturation may be fine. The number may be more than this 94 magic number but one may not feel very well. So what we used to tell the patients at that point of time, in those scenarios, was to do some exercise tests. Check your saturation before exercise and after exercise, and it was a very simple, like one-minute sit to stand or a 40 step test. So one minute sit to stand, we will ask them to sit on a chair, sit and stand on a flat chair for one minute. Check you saturation before and after. And if post exercise, the saturation falls by three numbers and below 95%, then we ask them to contact the physician. For example if your saturation at rest is 97% before exercise but on exercise it falls by three numbers to 94%, then you should contact the medical facility. Apart from that what we told the family members and the patient was to look for any increase in the rate of breathing or use of you know, accessory muscles of respirations like your nasal flaring or your neck muscles becoming more prominent. So one of the family members was asked to observe when the patient was in home isolation.

So, these were some of the signs. These were some of the warning signs which used to tell them, you know, patient may be in respiratory distress and you need to contact immediately to the physician. Other warning symptoms of course would be feeling of shortness of breath, dyspnea, dizzy, unable to remain awake etc. which may warrant urgent medical attention. Now, I would like to highlight upon the use of oxygen. Now we know it is required in certain situations. Particularly in COVID. It's really important that we know when and how we give oxygen. It is prescribed in patients with a saturation less than 92% at rest, or if you have an ABG with, if the PaO2 is less than 70mm of mercury and some people take it a little more conservative and make it as 65mm of mercury. And of course, if the patient is in Type 2 respiratory failure, then these levels are little, the cuts are little lower and you tend to give these patients oxygen only when the saturations are lower than 88%. The target saturation with supplemental oxygen remains between 90 to 95% whereas in COPD, it should be between 88 to 92%. Now why I am saying so, there is a robust evidence in the form of meta-analysis which compare the mortality and the morbidity outcomes in acutely ill adult patients who were treated with liberal conservative oxygen therapy. When I say liberal, the aim oxygen saturation to be more than 96%. But the evidence showed that the liberal oxygen therapy actually increases the mortality, without improving any other, you know patient-related outcomes. So in other words, supplemental oxygen might become unfavorable if we are aiming saturations above 96%. Hence, we've to be very careful and we should be targeting the saturation between 92 to 95%. Another important thing to consider is, what device we should be giving, what delivery device we should be using to give oxygen to the patients. Or does one size fits all? Again, the answer is no. You know there are a few low FIO2 devices like nasal cannula and face masks. And there are some high FIO2 devices like Venturi masks, non-rebreather masks and high-flow nasal cannula. With a nasal… If you have to give low flow oxygen, like somewhere in the range of 1 to 4 liters, it can be given with a simple nasal cannula. Maximum you can give up to 5 liters.

Now beyond that if you want to give oxygen through the nasal cannula, it causes dryness of nose and discomfort. Moreover, you may not be able to deliver high FIO2. Hudson masks which we usually say can be used to deliver oxygen at the rate of say about 5 to 10 liters, but it is advisable to use Venturi masks if more oxygen is required which can actually, accurately deliver the high concentration of oxygen according to the flow of oxygen delivered. So with these Venturis we can deliver oxygen with an FIO2 somewhere between 24 to 60% with flows varying from 2 to 15 liters. Non-rebreather reservoir backed devices are also traditionally used to deliver high FIO2 or when we required somewhere, say more than 80%. Now advantage of these devices is that, during expiration the incoming oxygen is not wasted into the atmosphere and it is used to fill the reservoir back from which the patient breathes during the next expiration**.** We should use appropriate oxygen delivery device to ascertain adequate oxygenation without wasting oxygen or causing harm to the patient. And in the similar manner, oxygen titration becomes equally important when the patient starts improving. You should titrate to the minimal oxygen requirement to maintain the target saturations.

We have various sources of oxygen which maybe in cylinders or line supply in hospitals but oxygen can also be delivered through oxygen concentrators which operates on electricity and they are portable, so areas where, you know smaller areas where the parameter is that they require recurrent filling and if that facility is not available, portable devices like concentrators can be used. But at the same time, since electricity is required to you know, produce oxygen from the atmosphere, we have to either back-up with the generator or it should be placed where electricity is available. But mind it, it has a limitation that it can deliver oxygen up to 5 liters and there are few which can give up to maximum 10 liters and they cost around, somewhere around 40 thousand to 60 thousand in Indian Rupees. And last, I would also like to talk about a useful strategy which is called awake self-positioning or proning. So basically proning is the process of turning a patient from back onto their abdomen or the stomach, so that the individual is lying face down. This is a medically accepted position to improve the breathing comfort as well as oxygenation. There has been many observational and few retrospective studies in COVID-19 patients, which have found that proning is extremely beneficial in COVID-19 patients with complex breathing comforts specially when they are in home isolation, mind it. We do practice in hospitals as well. Now it is advised when the patient feels difficulty in breathing or saturation decreases below 94%. At the same time, the patient should be able to change the position on his own or with some assistance.

Briefly how do we do it, so we ask the patient to lie down on their tummy, for the time ranging from 30 minutes to 2 hours. That is fully prone. Followed by right lateral position for the similar duration. Followed by you know, sitting up at 30 to 60 degrees for the similar duration. Then lying on the left side, and then again proning. So this cycle continues. Now patient should fully understand what he's going to do and he should cooperate to do the positioning. However I would like to say, if the patient is in respiratory distress or he is unstable, has altered sensorium or he has an unstable spine or recent abdominal surgery or you know, proning will really be contraindicated. Some other situation where this positioning may be difficult will be ladies, pregnant ladies in their second or third trimester or a very obese patient or patients with some facial injuries and all. So, if I want to summarize about the oxygen therapy, some practical points in patients with COVID-19, I would say, four or five or six of them. Number one, you monitor the saturations four times a day. It's not required more that that to monitor. You should seek medical advice if the saturation falls below 94% or there is excessive desaturation as I told. Appropriate oxygen delivery device should be used for the appropriate flow of oxygen. Target saturation when we are supplementing oxygen should be 92 to 95%, not more than that. And for COPD or Type 2 failure patient, it should be 88 to 92%. Awake self-positioning or proning is advisable to improve the oxygenation in patients with COVID-19, if they are not able to maintain their saturation level above the magic number of 94%. And I would also like to say here, that we should be prudent and we should be using oxygen judiciously, while avoiding any adverse events. So, this is all from my side for the moment and I'm really thankful to the organizers for giving me an opportunity to

be a part of this forum and share my experience in what we had in managing the patients with COVID-19. Thank you so much and I'm open for questions.

Rajani Bhat: Thank you so much Dr. Richa. That was truly you know, wonderful to hear your insights and your pointers to practitioners on the ground as to the things that they must keep in mind when they are taking care of patients with COVID-19, especially in the context of patients who are being monitored at home, who are those receiving oxygen. As we've been seeing, across the world there have been facilities that are not part of the hospital but are, for example COVID-19 treatment facilities which have oxygen delivery devices, meant to augment the healthcare infrastructure and make sure that the tertiary care centers are restricted for patients who need more acute attention and need specialized care. I think what I'd like to do is I'd like to go on to ask Dr. Paul Sonenthal more about those kind of situations where patients need more than just the oxygen delivery devices or need advanced oxygen delivery devices or ventilation. We've seen this to be a challenge across many countries in the world because these are precious resources, whether it's ICU beds or it's non-invasive ventilators or it's high-flow nasal cannula or invasive ventilation. And it's not the question of the equipment but it's also about the trained personnel and using this appropriately. And Dr. Paul Sonnethal is in the unique position of having the expertise of having set up systems in countries where there are limited resources. And I'd like to invite him to speak to us and share his insights about the challenges in setting up health systems that are robust and where we can implement the best practices. Dr. Paul Sonenthal.

Paul Sonenthal: Thank you so much and I'll start by saying it's an honor to be here and I want to thank the Mittal Institute and the Swasth Community Science Alliance for having me here. And I also want to applaud Dr. Richa for giving, what was a remarkable distillation of the scientific knowledge and recommendations we have for treating patients with COVID. I think, you know, everyone who's watching may not appreciate, but we appreciate, but what she just described was you know conclusions and consensus and evidence that has developed over the last year and a half and even longer. And I'm very impressed she was able to provide it, because off the top of my head I don't know if I could be as extensive.

But I would like to talk a little bit about the challenges that come with providing high-quality care to for patients who are severely ill. And I want to start by framing that discussion by introducing the organization I work for which is Partners In Health, and Partners In Health is an international, non-profit that is committed to providing a preferential option for healthcare for the poor, all over the world, but in particular we work in about, roughly a dozen countries. And we achieve this through a comprehensive approach to health systems strengthening. And specifically we think about, we call it the 5Ss. So when you want to develop and strengthen a health system or an intervention or a process, you want to have the staff, the systems, the stuff or equipment, the space and you also want to have the social support. And what we've seen historically, through long-term commitments in various countries as well as responding to catastrophes such as the Haitian earthquake, cholera, ebola, now COVID, we've seen that the successful interventions really are comprehensive in that way. So to reframe it, it's a question of how do you take these excellent recommendations that Dr. Richa provided us and bring them to life. Because they are the core and they are the backbone but how do you do that. And just to give an example, she spoke a lot about titrating oxygen and making sure you have your goal oxygen saturation and the challenge I found, working with colleagues in Haiti, where I am at right now, in Malawi, in United States is the recognition that these things require constant reassessment, right. It's not a check the box, set it and then come back at the end of the shift. It's constant reassessment and having the staff that allow you to do that, having the systems and training in place and also the equipment, it really, all of those things are necessary and no single thing is sufficient to accomplish these goals. And it becomes even more the case when we talk about things like high-flow nasal cannula, non-invasive ventilation and invasive ventilation. So you know, my sense is, or my experience throughout this pandemic has been, many people have come to me with admirable goals of saying 'I'm working on inventing a new ventilator' or 'I've developed this technique to split ventilators' and while I'm deeply, deeply appreciative of their commitment to

address the COVID pandemic, what I always say is the presence of a ventilator is not the solution, is not the element that will allow you to have mechanical ventilation. What you need is you need staff that are trained to intubate a patient, recognize when they need to be intubated, monitor them. You need supply chain management for consumables. So if you don't have humidification, whether it's through a heat and moisture exchanger or an active heater humidifier, patients will develop hemoptysis over time, they will become really uncomfortable. You need fresh tubing. You need sterile water or you'll get potentially pulmonary infections. We see you know, Aspergillosis possibly coming from contaminated humidification water. And you need, the most important thing in my opinion is skilled nursing. I think skilled nursing is hands down the most important thing. And when you don't have all of these things working in harmony, it's a challenge.

And that's not my way of saying it's not worth being done or we shouldn't do it but it's just saying that whether you're in the setting of long-term health system strengthening or responding to a pandemic, to be able to accomplish your goals of providing things like mechanical ventilation, you really do need to think about every single aspect of the care you're providing or else you run the risk of not helping patients, maybe even harming patients and spending, you know, money ineffectively. So I think that an example to give you is, so Partners In Health after the Haitian earthquake, a little more than a decade ago, in the aftermath Partners In Health committed to building a hospital in Haiti, where I am at right now. So the response to a catastrophe was build a hospital, develop residency programs, staff the hospital's supply chain, build the health system. And what I can tell you is, at the start of the pandemic, this hospital was the only COVID treatment centre in the country, for several weeks. And we continue to be the place where people are referred for higher level care and that's because that's the approach we've taken. And so, you know, that's the broad approach to understanding how to provide the more, kind of complex higher level care for sicker patients. There are plenty of specifics and details about techniques and things to keep in mind which I'm happy to get into as we discuss or field questions, but I just wanted to start with kind of that broad framing of the approach that I take, which is really the approach of Partners In Health, is the kind of, is how do we bring to life that expert advice that Dr. Richa just shared.

Rajani Bhat: Dr. Sonenthal, could you speak of some of the concerns that practitioners on the field have with the notions earlier on in the pandemic that non-invasive ventilation or high-flow nasal cannula was not to be used, keeping in mind the potential risk to healthcare workers and aerosol enhancing modalities. I won't like to call them aerosol generating, but aerosol enhancing modalities. And how has our practice changed over time? So earlier on, we had this notion that early intubation was the way to go and then we realized that the wisdom that has stood the test of time still holds true for ARDS with COVID-19 and what would you like to you know, share with the practitioners about what the approach should be now in terms of, how does one select the modality of advanced ventilation or oxygenation for a patient.

Paul Sonenthal: Yeah, that's a fantastic question and certainly with our knowledge, you know, our approach has changed. And I'll start by sharing a story that from the very first days of the pandemic when I was working in my hospital in Boston, this was when the United States was in the midst of its first wave and we did not have COVID tests but we had patients who we presumed had COVID. And I remember, I was attending in our ICU and there was a patient who was ill and I was discussing with anesthesia and an anesthesia trainee came up to me and said, 'We must intubate now, this is classic for COVID!' And I looked at him, and I said, 'How many cases of COVID have you ever seen?' We didn't even have positive tests and you know, it's this notion that we search for certainty and in the absence of evidence, anecdote, the plural of anecdote is not evidence but sometimes we elevate it to evidence and sometimes fear, and understandable fear also changes our approach. So initially, I think that we wanted to, we were concerned about aerosolization or aerosol facilitating procedures, such as high-flow non-invasive - at my hospital we avoided it. And what that left you with, that left you in a situation where you didn't have a higher level of modality to support the patient and the fear was that you did not want to call for an emergency intubation. Because that's the situation where people are exposed. And

we also saw that patients tended to get worse quickly. So all of that together contributed to this policy, at least in my practice setting of early intubation. But now we see, with time and kind of evidence and calmer reasoning, that we really don't see an increase in nosocomial infections with proper seal with your non-invasive masks and we, I encourage a surgical mask over the high-flow nasal cannula. And there is some evidence that that doesn't increase CO2 retention.

But essentially for me, I use non-invasive and high-flow for the same indications that I would for any other respiratory infection or disease. If someone has hypoxemic respiratory failure and I think that, you know, non-rebreather masks or Venturi mask isn't enough, I increase to high-flow nasal cannula. If I think there is an element of increased work of breathing, then I will use non-invasive or if there are other indications for non-invasive like COPD or heart failure or immuno-compromised patients with hypoxemic respiratory failure. A nd then intubation, it's the same as now everything we've been doing before. There was a recent meta-analysis that didn't seem to show any benefit from, and admittedly the data are limited, a lot of it are observational. But there's no clear signal that one way or the other is worse. And in the absence of that, let's stick with what we know. So it's, you intubate patients when you otherwise would. Although there are considerations in terms of resources and ability to provide appropriate monitoring. One point I will make that is, often, I think confused is that the amount of oxygen a patient will consume actually will go down when you intubate a patient. So I've encountered situations where clinicians understandably say , 'I don't want to intubate them because we're short on oxygen. We want to conserve oxygen.' And even though intubation and mechanical ventilation is a higher intensity modality, in general the amount of oxygen you will use decreases. For a variety of reasons but mostly because you have a good seal with the ET tube hopefully, and you're delivering oxygen straight to the lungs. So, that's a really long way of saying, I treat these patients the same way I would treat influenza, pneumonia or another type of viral respiratory infection. I hope that answers your question. I'll pause there.

Rajani Bhat: It does. That's very helpful. So I think, you know, what was really interesting is that I think, in the first wave there were concerns about the safety of healthcare workers. There was also the concern about shortage in personal protective equipment. And also, we didn't have healthcare workers vaccinated. That still remains a concern for some countries where we've still not achieved vaccination of all essential workers. But your insights are really reassuring in the fact that these are challenges that can be faced, which is keeping the same classic guiding principles of critical care at the bedside in mind. I'd like to come back to Dr. Richa with a question about oxygen use and judicious use of oxygen, something you brought up as well Dr. Sonenthal, about how it is paradoxical that what we think sometimes is an excessive use, may be something that intubation can help us in conserving that. But Dr. Richa, were there any particular practices in your experiences that you found were useful in helping to just be more responsible whether at an institutional level, at CMC Vellore or in COVID treatment centers. What would be your suggestions and recommendations to people, to keep in mind, that there are still plenty of places where oxygen still remains in short supply. So what would be the best practices that we can follow to minimize any excessive use and just be judicious in our use of oxygen.

Richa Gupta: Right. So, Rajani, compared to the first wave, which was last year in our country where it was liberally used oxygen and then over time, we got a lot of evidence which suggest that you know, overuse of oxygen is really harmful in fact. So unlike last time, this time we were very careful and this time there were very **X (37.55),** the targets we set. And I mean, I work in a place where you know, it's pretty much well organized, a centered institute where everything is well in place. So I understand when Dr. Paul said we need trained people, trained nurses to you know, even titrate or see that things are going right or not. I am particularly in a place, where yes, I am, fortunate to be here. So one thing is, as I said, judicious in setting the targets. The targets should be met. It should not be more than that. Then using, if you're requiring more oxygen, then probably using the non-rebreather masks. Or when the patient comes in for that matter, I think saturation should be checked if facility for ABG is there. I mean, I don't know whether in a resource-poor area setting, we may not have an ABG. But at least saturation should be guiding

us, you know, to give the oxygen. I'll give an example, you have a patient who comes into your casualty or ED and who is gasping. The very common practice even to the nurses in the ED, is that they will put the patient on 100% oxygen with an RBM at 15 liters, 100% and that's it. They don't even, you know. That is the first thing. If a patient is desaturating, that is the first thing they will put.

So, I believe all the patient is —, that was the first thing. So those were the things we targeted in ED, where we asked them that do not conserve oxygen and titrate oxygen as, not only that we have more number of patients and we may have a deficiency, we may end up having deficiency in terms of oxygen supply, but at the same time we need to protect the patient's lungs as well. So, at that level, we targeted them and there were strict instructions, saturation, check the saturation and accordingly give the minimal oxygen required to keep the patient comfortable. Keep the saturations in place. We also had set criteria if the patient is requiring oxygen, the respiratory rate is high, it's not getting down, then we were actually putting these patients on early NIV, the CPAPs or again, if the things are not working out then they will go on BiPAP and that really, that does improve the outcomes in the patient. Now talking about, in areas, in the places that we really don't have much of the health facility, I really, I think we have to be really conservative. We have to be sure, we have to be checking now and then that, like few things could be - there is no leak around, you find patients putting on oxygen but the cannula is actually out and the patient is just, the oxygen is going waste. Masks will be somewhere down, you know, below the nose. So, active monitoring or at least telling the patients that they… They can themselves monitor actually if you just tell them properly that this is very essential and this is how the things have to be done. Especially patients who are well awake, they can practice it. Yeah.

Rajani Bhat: Thanks for bring up those points Dr. Richa about the vigilance in the emergency department about titrating of oxygen according to the saturation that the patient comes in with. I think the other part of it as well, that you know, especially now with the use of awake proning, this is one of the things we look out for, when patients change positions, whether the devices get dislodged. Sometimes, having a person - an assigned person in your facility, and that could be a nurse or a nurse's aid, who is doing frequent rounds of the facility. I think it serves two purposes. One is to check if the patients are on the appropriate flow, their saturations are monitored. It also helps us to pick up any change in the patient's clinical status early. So one of the things that came about as you mentioned, that in the first wave we didn't have a shortage of oxygen and now we did. So it's also as if the shortage has made us be more vigilant and that's helped us to even pick up clinical change in condition much faster. So I think that serves two purposes - they're looking for leaks, looking for devices that are disconnected. And you know, this brings up, in so many ways we've talked about antibiotics stewardships and now we're looking at oxygen stewardships. We've spoken about steroid stewardships, about the overuse of steroids. And the fact that… And I think that is a topic for another day, another discussion altogether about you know, only the patients who need oxygen requiring steroids, expect a very small group outside of that, that group of patients.

Dr. Sonenthal, if I may ask you, about any other issues that, I think, one of the problems that's come up is also about anticipating the oxygen requirement and the use of concentrators, devices. And what would be your advice to somebody who is setting up a place maybe, because that's… If one is looking at setting up a field facility, a field hospital and we know that we also have shortage of oxygen. So what would be the ideal devices that one looks at in a situation like this? We know that high-flow nasal cannula consumes a lot of oxygen. We know that there are certain modalities that use up a lot of oxygen, but one of the things has also been about, the number of devices that people have been looking at procuring. So sometimes, there are these new models of ventilators that one is considering. If I am a person who is just setting up a facility, what are the things I should keep in mind, when I'm looking at picking up equipment maybe?

Paul Sonenthal: Yeah, I mean that's a great question and a very, very broad question. I'll try to do it some justice.

Rajani Bhat: Maybe, just the overarching principles of how I would do that.

Paul Sonenthal: So I think, you know, the first step is thinking about what types of patients you're going to take care of, what type of patients you want to have the capacity to take of. Whether you want to be able to take care of all patients or you want to have like, more of a primary or secondary type of facility where you stabilize and then transfer other patients. I think that's the first step. I think it's very important, and I feel strongly and I recognize that in many places we're in a crisis situation but I think that it's always still possible to have an approach to take care of even the sickest patients. And I think it's, you know, I strongly advocate for not kind of saying, you know, we give up on some of the sickest patients. So for about two-thirds of the patients who require admission with COVID, so we're talking 15% of all COVID patients. They'll require oxygen. And they can usually get by with concentrators. The question is do you have a reliable electricity supply and you also need to make sure that you are regularly cleaning the filters on the concentrators. And that you are not turning the flow on the concentrators above the recommended amount because that damages the beds, for absorption and then, it also reduces the purity.

You can combine concentrators using the Y connector, so that if you have a 10 flow liters max, you can get it up to 20 liters a minute and that can provide support for someone on a non-rebreather. So you can get by for most patients with concentrators. But concentrators alone are not enough. Because one, you need a backup supply. So you need to have some amount of cylinders in case there's an unexpected outage, in case something breaks, you need to have cylinders. And then if you are doing mechanical ventilation or high-flow or non-invasive, then you need a higher pressure oxygen source. And so that has to be either released cylinders or wall oxygen from a PSA plant. If you are not doing that, you still need cylinders because you have to have oxygen for transporting patients. And so this is something that I think often gets lost, is that the absence, the reliance on concentrators at primary facilities leads to not having any cylinders. And the absence of a cylinder cuts off a facility from the referral system. Because if you can't transfer a patient with oxygen needs, with a cylinder, you basically have nothing to offer the patient other than what's on site. And so I think, regardless if you're going to think about transferring, you need to have cylinders. And then, when you think abut ventilators, you know, my preference, so there are some benefits to the LTV transport ventilators in that, you can use low pressure oxygen-like cylinders. I feel pretty strongly that you want to have a screen where you can see the flow and pressure tracings. It's not absolute, but I think it's pretty important. There are screens you can buy for the LTVs and transport vans. But ideally you have a ventilator that is simple, can do kind of pressure support, assist control in pressure and volumes modes. And that it has a screen and it can accept a high pressure or low pressure oxygen source. For me, that's like, that's really what you need. And you don't need these forty-fifty thousand dollar vans with you know, special, PEEP titration and all that stuff. I'm not an advocate of that. So if you do that and you rely on concentrators, for the people who aren't ill, it is not all that difficult to have cylinders for the few people who may need higher amounts of oxygen. So I believe it's feasible, but again you know, I want to also acknowledge that I have not, you know, I don't practice in South Asia and I don't, I don't pretend to be an expert on the context so I say that with, take it with a grain of salt.

Rajani Bhat: Thank you. That was, that was really useful information and it does bear out with the practice on the ground as well in South Asia. We've seen that you know people have used concentrators. There's actually be an outpouring of support from the international community, for whenever there's been a shortage of oxygen. There's been supplies of oxygen concentrators that have been channeled into resource-limited settings. Also along with oxygen cylinders as you mentioned. But for the practitioners, it's important to know how to use them well. And your insights were really useful on that. I also liked the fact that you mentioned about ventilators, about no needing the absolute high-end ventilators and also keeping in mind about the limitations of the transport ventilators. One of the things that I find is really useful is that, it matters that the staff is

familiar with that ventilator. Sometimes if you have a new piece of equipment that people don't know how to use appropriately, it can't really serve the purpose because it's, as you mentioned, it's not the ventilator, it's the team that you know, is helping the patient with that ventilator who actually manages to get the good outcome with that, in a patient with severe hypoxic respiratory failure. And you know, one of the other things that, I'd like to address another question that again we were talking about, how the knowledge has evolved from the first wave to the second wave. Again, in the early days we were avoiding nebulizations for the same reason. And looking at mainly metered dose inhaler devices for any kind of inhaled medications. But anything else that you would like to, you know, Dr. Richa, would you like to comment about that, about how has that panned out and how would one, you know, what would be the advice that you would give now.

Richa Gupta: Alright, so, nebulization is as you said, is considered as a, you know, aerosol generating procedure and people are scared of any should not be given is what the advice was. So, in the first wave, what we did was, there was no nebulization at all in all the wards. It was just MDIs with the spacer of time and again it has proven with various studies that MDI with a spacer is equally effective during the medication as the nebulizer would be. So nebulizer probably was reserved for the patient who were really not able to, you know, use the MGI. Though MGI can be used with the spacer with the tidal volume technique where you just, you don't have to hold but you just normally just breath in and out, five times and your medication is, at least a portion is in. Also Rajani, I would like to say, when we are talking about the oxygen and things like that, probably one of those method of conserving oxygen would be, there's a usual practice, where they give nebulization with oxygen driven nebulization, to conserve probably we give in medical air to nebulization. Or as I said, you can have MDI metered dose inhaler with a spacer which is equally, equivalent in providing the amount of you know, proper deposition of the drug into your airways.

Rajani Bhat: Yeah, that is a very useful tip, thank you.

Richa Gupta: Yeah, but do we have, we still did have concerns about that, but in very sick patients, yes, nebulizer was given. Does Dr. Paul have any say, I mean, what is his opinion about that. We at our hospitals, yes, we were not using nebulizers during this COVID times, especially in this COVID course.

Paul Sonenthal: Yeah. It's a good question and I mostly, I mean I pretty much agree with everything you just said Dr. Richa. You know, we have, at my hospital, we've tried to avoid nebulization, if at all possible. I'm of the opinion that if we think, if clinically we think a patient really needs it and it would be harmful for them not to get it, then I think it's important to find a way with proper IPC precautions. I will also add, that at my hospital, we had an outbreak of about, I think 70 people started from a patient that was you know, pre-symptomatic and getting around-the-clock nebulizations. And so there is, and actually I ended up getting COVID in that outbreak. Thankfully, it was quick and I recovered rapidly but we think it played a role. But there were many… But the reason I bring that up is not because I want to scare people about nebulizations, but in that event there were many lapses in IPC that allowed it to happen. And so, I think the point is that, if you adhere to kind of, careful IPC protocols and try to minimize unnecessary nebulizations, then you know, I think that's fine. Yeah.

Rajani Bhat: All right. Thank you so much. I mean, we're coming close to the end of the hour and you know, the more, I think the collective wisdom that I have gained from the conversation with the two of you has been that, to some extent less is more. And to keep the infection prevention control practices robust and strong. And to have greater systems about vigilance and stewardships, so to speak. There's one more aspect that you brought up Dr. Sonenthal which is about, when you were talking about resource-limited settings and you said about, we would like to give the best treatment to every patient. And there's always this part about distributed justice and rationing of treatment. Now, one of the challenges that we've seen in the global South is about the use of, or the approach of, the approach towards figuring out what is non-beneficial

treatment and having those difficult conversations about goals of care. And it's really about triaging patients appropriately. And I think, one of the consequences of the current crisis that many countries are facing and this is probably one of the good outcomes that may come out is a greater discussion about the need to have conversations about goals of care more. And another challenge some countries faced was a shortage in opioids and sedatives, and I know that is a sensitive issue but we always need to take care of the fact that in addition to the oxygen and the modes of ventilation that we offer to a patient, we also offer them relief from breathlessness. So I was just wondering, if for a quick minute, your thoughts Dr. Richa and Dr. Paul about these issues which are also essential to the management of hypoxic respiratory failure that's addressing goals of care, non-beneficial treatment and the use of palliative care and comfort measures for patients with breathlessness issues as well.

Paul Sonenthal: Dr. Richa would you like to begin? I'm happy to begin.

Richa Gupta: Please, please start off.

Paul Sonenthal: Ok, so I think that's an incredibly important question. I actually want to slightly broaden the applicability. So you mentioned kind of what to do when we, people know in Brazil in particular, that there were shortages of medications that you need to keep people comfortable and sedated on the ventilator or at the end of life, to keep people comfortable. And I would add that it's not even just about that, it's if you have someone on a ventilator and you don't have experienced and well-staffed nursing, you can't administer these medications even if you have them. And so, that's something I've seen a lot. And so, I think that it's really hard. And I frankly don't have an answer. But I think we need to approach these challenges with a lot of humility and acknowledge that one, we have the capacity to do more harm than good. So I think we have to acknowledge that, that's a possibility. Because I think that I see a lot of colleagues, not a lot of colleagues but I know people who say you know, because we're physicians and we're fighting disease, you know, we're insulated from these external concerns, like oh we're running out of medicine and we just keep doing what's medically indicated, and I think that is, I can say, that's not the right approach. But I think that, you know, as hard as it is in the setting of the pandemic is that you need to take a patient-centered approach. And you need to, as best you can, discuss with the patient and try and understand kind of what they, you know, what they want, what they need, what they would be willing to go through to achieve those goals. And you try and serve them, the best that you can recognizing that, you know, you could put them through considerable discomfort. On the flip side, I will say that there are studies looking at mechanical ventilation without sedation, you know or minimal sedation. But I think it's just so important, I think it's so important not to get burned out, to become numb, to you know, lose your sense of humanity, and it's a constant struggle but I applaud you for bringing it up and asking the question, and I wish I had a more concrete answer other than, I know how not to approach it and I know how I try to frame it. But it's tough.

Rajani Bhat: Well, thank you for that very authentic from the heart answer. Dr. Richa, would you like to add something to that?

Richa Gupta: I agree completely with Dr. Paul and you know, there has been situations, it was not really nice to see your patients given, how would I say, a whole set of medications, whether useful or not. God knows. Though I am here, remotely I was managing a lot of patients back in hometown and North India and some prescriptions of about 15 tablets. You know, 15 medications which would be given. It's a printed thing. It's given to everyone and they have to use it. And one of those medications, Feriper, which I haven't used it but I believe it's some 6 or 8 tablets, 3 times a day or something like that you have to take. It's… I don't know. I mean, it is really, I mean we have to come up with concrete guidelines and more than the guidelines which will be there all over, it is how we are assimilating the knowledge among the people, what to use, what not to use, to keep our patients comfortable, you know. As Dr. Paul said, yes, it's like… I'll just give you an example. So there's lots of therapies, lots of medications, you know, when the patient is so sick,

they wanted to give it. Say, what to do. We have nothing, let's just try it. No, it doesn't. You don't know the harmful, if you don't know the beneficial effects, can you say what it's not going to harm right? So that part was taken away. And who is there to audit whether this medication you have given as a rescue has actually caused the harm, has actually caused the death of the patient, untimely death of the patient. So yes, there should be rationing on everything, there should be dissemination of knowledge, specially in our country I would say. Sorry to say that but, yes. There should be someone to hold, yes, this is not right. This is wrong, you cannot practice that. There shouldn't be any over-the-counter drugs kind of a things.

Rajani Bhat: Yeah, thank you so much**.** We have one question from the audience, and I'm just wondering if one of you could address that. It's about, this is… just a moment. I'm going to bring the question up. It's from Mr. Ramesh Verma saying they tried using the UCL Ventura CPAP very efficiently. Using oxygen with astounding results and it helps to use the available oxygen for more people and I'm just wondering about, if either of you have experience with that and if you can comment about that.

Richa Gupta: No, actually. I really don't have an experience. At our institute, we don't have UCL Ventura devices. Dr. Paul has.

Paul Sonenthal: So, I have not used it but I'm familiar with it. So I can say, it was developed by a team, I believe it involved at least one person who I know - Tim Baker, who is very smart, very good, very thoughtful so, my understanding is that it can conserve oxygen while delivering CPAP and it's fairly straightforward and fairly inexpensive. And so I think, I think that you know when I've seen devices used in the setting of this pandemic, there's kind of, there's two main aims. One is to improve resource utilization and efficiency and cost, while kind of achieving similar clinical goals that other things would provide or provide some sort of clinical benefit that is new. My understanding is that this falls into the former, and you know, I know it's been tested rigorously and so I think it's not something I necessarily can say, absolutely we should massively scale it up and anything we use should, you know, we should try and collect data and understand. But from what I know, among the devices that have been done and produced, this is probably one of the more, through a process, has had a process that's more reliable and kind of, expert-driven and I, if I had it, I would be comfortable using it. If I thought it was indicated.

Rajani Bhat: Well, thank you so much. And we're past the hour and I think, I want to thank both of you, Dr. Richa, Dr. Paul for spending this past hour with us, sharing your insights and your recommendations for practitioners who are continuing to face the challenge with COVID-19 across the global South. And it's been a real pleasure learning from the two of you and I think, these are… you've given us a lot of really practical tips and pointers about how we might be able to serve our patients better. So thank you very much. And with that, I'd like to hand it back to Satchit for closing remarks.

Satchit Balsari: Thank you. I'd be glad to. Thank you, all of you for an excellent start to this series of lectures with practitioners. We will be making the link to the online repository available so that it can be obtainable of course for clinicians in India. So we will make it available, easily available via mobile devices within the next couple of days. Please check the link that I have dropped in the chat for all of us where the schedules for the next two panels will be posted very shortly. We hope your colleagues and you can join us. Please feel free to write to us if you have feedback on how these panels can be constructed or topics that you would like to hear about. Thank you kindly. Thank you everyone.