Stony Brook Medicine

Dr. Kenneth Kaushansky's report to the University Senate
April 6, 2020

Dear Members of the Health Sciences Campus of Stony Brook University,

I write today to update members of the Health Sciences Schools and Hospital on our efforts to overcome the COVID-19 pandemic, at least in Suffolk County and perhaps, far beyond. In short, we have mounted an amazing effort as the winds of the pandemic are building up, with ever-increasing numbers of infected individuals being identified. We have prepared for the coming "perfect storm." And we have begun to model what the campus will look like when the flood waters begin to recede. And while our efforts to buffer the storm have been very well coordinated on many, many fronts, I will summarize our efforts by category.

Disclaimer: What follows is a fairly detailed description of the efforts of hundreds of leaders from every corner of Stony Brook Medicine, from clinical to research, from basic to applied, from medical to nursing to technologists, and the spectacular response of several thousand members of the Renaissance School of Medicine (RSOM) and about 7,000 staff members of Stony Brook University Hospital (SBUH). For those who are faint of heart, or overtired (and hence already poised to nod off), please feel free to read as little of this note as you like! And if you are a numbers geek, you might be most interested in section 2, below.

With that disclaimer aside, let me begin by explaining the basis for the coordination just mentioned, what I like to call the COVID choreography. Four weeks ago, a Hospital Incident Command Center (acronym HICS) was activated, at first in face-to-face meetings, and of course, soon after launch, as twice daily, virtual meetings. In each meeting each operational director reports on the past 12 hours of activity, reporting current conditions, problems encountered, successes achieved and what the next 12 hours likely holds. Virtually all the major leaders of the RSOM and SBUH sit in (listen in) on these updates, including hospital leaders (e.g., SVPHS, CEO, CMO, CNO, CFO, CHRO, CIO, hospital directors), school leaders (e.g., Dean GME, Dean Clinical Affairs, all Clinical Chairs, critical Division Chiefs (e.g., ID, Hospital Medicine, MICU)) and many Stony Brook Medicine healthcare system leaders. Altogether over 100 leaders of the organization are "synchronized" at each meeting, allowing rapid dissemination of information, better resource utilization and inter-unit cooperation. The realms that are discussed at the HICS, and throughout Stony Brook Medicine, fall into several categories.

1) **Preparations for the coming, perfect storm, aka "hospital surge capacity"**

I have now sat in on four meetings with Governor Cuomo, and many of us have listened to many of his press conferences. Each meeting/conference begins with predictions of numbers of infected individuals, numbers needing hospitalization, numbers needing mechanical ventilation, and when the peak of these occurrences will arrive. The most recent model predicts the peak of the New York COVID epidemic arriving in 15-20 days. At that time it is predicted the statewide need for hospital beds will peak at about 2.5 times the current number (57,000), the number of intensive care unit beds will peak at about 12 times the current number (3,000) and the number

of ventilators will peak at about eight times the number present in NY hospitals prior to COVID-19. I am proud to report that Stony Brook is doing our share to surge hospital capacity.

Thinking both within and outside the box, Carol Gomes, CEO of SBUH, and her team believe we can increase the number of beds by about 700, not counting the 1,000-bed Army Corps of Engineers Field Hospital you may have heard is to be assembled on the Stony Brook campus. We can quadruple our number of ICU beds, and are working very hard to be prepared with sufficient ventilators for those acutely ill patients. We are doing all of this by converting idle (because of our canceling elective surgeries) Operating Rooms and post-operative recovery rooms into ICU beds, scrapping our plans to turn two-bedded rooms in the "black hexagons" hospital tower into one-bed rooms, and reclaiming the recently vacated floors in the hexagons and converting them into ICU wards. We are converting our ambulatory spaces, in the new Cancer Center, in the Ambulatory Care Pavilion (the old cancer center), and in Commack, into lower acuity hospital rooms. And we are employing a number of other, innovative "conversions."

As I call it, "stuff and staff" is a major concern. Protection of our faculty and staff from infection with SARS-CoV2 while conducting their lifesaving work is of foremost concern. Like virtually every hospital in the NYC region, personnel protective equipment (PPE) is in extremely short supply. We have sufficient PPE for staff and continue to develop alternate resources to stay ahead of growing PPE needs. For example we are bringing to Stony Brook a system to safely sterilize (the now famous) N95 masks, allowing their re-use many times. We are building an oxygen "tank farm," because our need for O_2 will skyrocket as the number of mechanically ventilated patients climbs. Faculty members in the RSOM worked with colleagues in our College of Engineering and Applied Sciences (CEAS) to fashion a new type of face shield and then worked with a local plastics fabricator to provide us with large and sustainable numbers of these critical PPE. And a new type of ventilator is being designed and a prototype constructed by faculty in CEAS as we speak. But the best-equipped hospital cannot deliver excellent healthcare without the right people in the right places. If we are to double the number of SBUH patients, and in whom four times as many as usual will be critically ill, we need outstanding physicians, nurses, respiratory therapists, and many more of every healthcare professional we can enlist. And we must arrange them in teams to better and more efficiently care for our patients.

To address this greatly expanded need for healthcare professionals, we are drawing on many strategies. Led by Drs. Margaret McGovern and Todd Griffin, one strategy is to redeploy certain groups of physicians and staff who are being under-utilized, because of diminishing activities in their usual area of work. For example, we have cancelled all elective surgeries, greatly reducing the numbers of surgeons, anesthesiologists, operating room nurses, ambulatory surgery center staff, etc., needed to care for the ~200 surgical patients present in SBUH on each (ordinary) day. These healthcare professionals are being reassigned to inpatient medical services, and emergency services, as the number of COVID-19 patients climb. A similar redeployment is occurring from many of our ambulatory clinics, as the number of clinic visits is down to about 25 percent of its normal level. And while an anesthesiologist might not be the usual provider for a patient with diabetic ketoacidosis, teamwork is providing us back-ups and back-ups to back-ups. And a third

major source of net new healthcare professionals will come from our graduating students (see below).

2) **Clinical care at Stony Brook University Hospital.**

Over the past month, the number of patients who have documented COVID-19, or are persons under investigation (PUI, patients with the symptoms and signs of COVID, but their SARS-CoV2 assay has not yet returned, has continued to climb. Here are the numbers of patients in SBUH on Monday, March 30:

Number of COVID-19 plus PUI inpatients = 307, or ~50% of our bed capacity
Number of COVID/PUI patients in an ICU = 75
Number of COVID/PUI patients on ventilators = 58
Number SBUH staff SARS-CoV2 positive = ~60
Number of COVID/PUI patients discharged to home this weekend = 6

Overall, the number of COVID-19 plus PUI patients has been increasing from 6-20 percent per day, and the number of patients on ventilators has been increasing at about a similar rate. These numbers are causing alarm, as the public health models predict we are still two to three weeks away from the peak of the epidemic in New York. We also know from current numbers that about 1.5 percent of infected individuals in New York State have succumbed to the infection, but at this point in an epidemic, mortality rates are always *far higher* than what is actually occurring, simply because symptomatic individuals are always the first to be tested, so the number of infected, asymptomatic individuals (certainly the vast majority of those infected), is grossly underestimated.

3) **Modifications to the educational preparation of medical, nursing, health technology, dental, social work and public health professionals.**

Because of the statewide need to socially distance, led by the educational deans in each of our schools, all coursework in all of Stony Brook Medicine has been converted to online study, going live today, Monday, March 30. Continuation of experiential learning is varying by school, but in general will continue for those settings that do not require face to face (f2f) contact between learner and patient. However, in most schools, when f2f cannot be avoided, experiential learning is being converted to telemedicine interactions.

A special consideration is being given to our graduating senior students. As graduation for senior medical students (and possibly in nursing and/or respiratory therapy) is just seven weeks away, and our graduates do not start their residencies until July 1, after having secured the requisite approvals from all the necessary agencies and accrediting bodies, we are allowing our senior medical students to graduate in early April, and asking that they begin their professional career as a physician at Stony Brook University Hospital, working under the supervision of senior residents, fellows and attending physicians. I sent a letter with this information and proposal to all our graduating medical students earlier today. We expect our students, like so many others at Stony Brook Medicine, will answer this call to exemplary duty.

4) **Clinical Research in Patients with COVID-19**

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A number of clinical trials have been, or soon will be launched at Stony Brook Medicine designed to identify effective therapies for our most critically ill patients. Most of these approaches are based on the initial experiences of investigators and physicians in China and Western Europe. While not robustly proven to be effective in patients with COVID-19, each of our efforts are theoretically sound and will hopefully lead to more information and better outcomes in our patients.

SARS-CoV2 is a single-stranded RNA virus that upon entering a target cell must use its RNA dependent RNA poiymerase to make a complementary RNA, to begin its replicative cycle. A nucleotide analogue that blocks this enzyme, Remdesivir, developed to treat two other RNA viruses, Ebola and Marburg, has been tested and appears to be effective in treating COVID-19 in China and in Washington State. We have administered Remdesivir to two patients thus far with severe COVID-19. We are attempting to become part of the clinical trial run by the drug's manufacturer, Gilead Sciences.

About a year ago, I was approached by scientists at Regeneron to explore ways to work together in areas of our scientific expertise. Several Regeneron scientists have met with several of our faculty over the year exploring the possibilities. When results from China indicated that inflammatory cytokines might contribute to the pulmonary complications triggered by SARS-CoV2-induced pneumonia, and that blocking the pro-inflammatory cytokine IL-6 helped 20 patients with severe COVID-19, one way of working with Regeneron was suddenly obvious. Led by Dr. Bettina Fries, we have become part of a Regeneron-sponsored clinical trial for their drug Sarilumab (Kevzara), a monoclonal antibody which blocks binding of interleukin-6 to its receptor. Sarilumab is already FDA approved for the treatment of juvenile rheumatoid arthritis, and more recently for the cytokine storm that accompanies the use of CAR-T cells for acute leukemia, made famous in the book "The Emperor of All Maladies" by Siddhartha Mukherjee and in the subsequent documentary of the same name by Ken Burns.

Serum or plasma therapy for infectious diseases dates to the 1890s, when serum made from immunized animals provided the first effective treatment for *Clostridium tetani* and *Corynebacterium diphtheriae*, the causative agents of tetanus and diphtheria. Alexander Fleming's discovery of penicillin in 1928 put passive antibody therapy on the proverbial shelf, as antibiotics became the preferred treatment for infectious diseases. But the concept has not disappeared. As but one example, in hematology we still use intravenous gamma globulin (IVIg) to treat patients with chronic parvovirus infection in immunocompromised patients with virally induced red cell aplasia, because the vast majority of blood donors (from which IVIg is derived) are immune to the virus. Led by Elliot Bennet-Guerrero, and based on similar studies in China which showed promise, we anticipate launching a randomized clinical trial of donated, post-convalescent plasma from COVID-19 patients very soon, based on the level of antibody titers to SARS-CoV2 in the donor plasma.

Modest anecdotal evidence that the anti-malarial drug hydroxychloroquine may have some effect to reduce the viral load of SARS-CoV2 in COVID-19 patients, especially when combined with the antibiotic azithromycin. A very recent publication describing a single-arm study from France appears to support this conclusion. Because of this, and because of the firestorm emanating from

the pronouncement by the President that his hunch was that it would work, a wave of prescribing and self-prescribing of hydroxychloroquine by numerous physicians was triggered, leading numerous State Governors, including Governor Cuomo, to impose a ban on the prescription of the drug except in clinical trial settings. On the premise that a modestly effective therapy might have more effect in minimally affected, infected individuals, Dr. Fries has suggested that we should test this combination in the numerous Stony Brook patients who present with symptoms of SARS-CoV2, but who are self-quarantined at home, as they are not sick enough for admission to SBUH (i.e., a presumably lower viral load). I presented this idea to NYS Health Commissioner Dr. Howard Zucker, who is considering our proposal.

Early diagnosis of infection with SARS-CoV2 is important, in order to identify individuals who need to be quarantined, not just socially distanced. But early-enough diagnoses are very difficult, because many/most patients are asymptomatic when they become contagious. Lily Mujica-Parodi has been part of a national effort to employ a wearable technology device (Oura) to collect sufficient physiological data, and use deep learning algorithms to predict the onset of SARS-CoV2 infection. We are hopeful we will be a major part of that effort, as we clearly have a large number of healthcare workers at high-risk-for-infection (staffing the ICUs, EDs, etc.), a group in whom device monitoring might be most productive/predictive.

In summary, we have analyzed, organized and prioritized, and are ready to tackle just about anything COVID-19 will blow our way. In a few months, when we are approaching the bottom of the descending slope of the epidemic curve, and have time to look back, is COVID-19 going to be "much about nothing"? Not a chance. Is COVID-19 going to be "the apocalypse"? Not a chance. Is COVID-19 going to be met and controlled by the incredible people of Stony Brook Medicine? Absolutely.

Let me close by repeating a few comments I made in a note to our department chairs a few days ago:

*Needless to say, it is not hyperbole to state that none of us have seen, or will ever see during our careers so severe a healthcare disaster as being dropped on our doorstep by SARS-CoV2 and COVID-19…. And while we face a serious challenge, we are one of the 100 best hospitals in the nation, and are used to huge patient care volumes…..But none of that really matters from this day forward….We are entering a new era in uncharted waters, facing a healthcare crisis none of us have ever, or ever (I hope) will see again….**So what we do here, what we do now, will define us!** Like all of you, I want Stony Brook Medicine to emerge from the COVID-19 pandemic as a leader, that it will be said that we took outstanding care of our patients despite the seemingly insurmountable challenges. That it will be said that we studied and learned more about the basic science, the clinical manifestations, and the predisposing factors to severe disease than the others…So, to paraphrase Kipling: if we keep our wits about us while all others are losing theirs, the world will be ours.*

I know that the post-COVID-19 world ***will*** belong to Stony Brook Medicine for one simple reason: our people. Our capacity for compassionate care, our capacity to adapt, our capacity to think, both within and outside the box, and our capacity to pitch in to help in any way possible

have been on glorious display for the past month, and, I trust, will continue until the last SARS-CoV2-bearing patient heals and returns home. Given the risks, the numbers, the devotion and the commitment, I would like to extend my personal, hearty thank you to the entire faculty and staff of Stony Brook Medicine. Know that your efforts are making a huge difference and are greatly appreciated.

Kenneth Kaushansky, MD, MACP
Senior Vice President, Health Sciences
Dean, Renaissance School of Medicine
Stony Brook University