Creating a COVID-19 Specialty Hospital

HIGHLIGHT

*COVID-19 patients have specific critical care and isolation needs and many hospitals across the country were not prepared or built to treat the significant patient surge in 2020. **Erica Kuhlmann**, DO, COVID ICU Medical Director, M Health Fairview (MN), shared her experiences transforming the system's Bethesda facility to a dedicated COVID-19 hospital in 2020.*

On March 20th, Bethesda Hospital was a long-term acute care hospital (LTACH) and we specialized in long-term ventilation weaning and rehabilitation. Less than a week later, we made history when we became one of the nation's first, and only, hospitals dedicated solely to treating people with severe, confirmed cases of COVID-19.

M Health Fairview is a large healthcare organization in the Twin Cities and we draw from more than nine hospitals. Senior leadership knew the pandemic would hit our system very hard, so we quickly strategized to handle a potentially overwhelming number of patients.

Our engineers, construction workers, environmental service staff, infection prevention experts, and others worked for 72 hours around-the-clock to transform and prepare the facility to serve COVID-19 patients.

Related Resources

[Creating a COVID-19 Specialty Hospital](#) (Speaker Series Recording)

[Designated COVID-19 Hospitals: Case Studies and Lessons Learned](#)

[Lessons Learned from a COVID-19-Designated Hospital](#)

First, we had to **transport our LTACH patients** to a one of our acute care hospitals. LTACH patients are complex; they are on ventilators and IV drips, so we had to quickly ensure that accepting facilities had the necessary resources to accept these patients in one day. We had many ambulances running all day to transport approximately 30 patients.

Next, we had to determine how to **transition an LTACH hospital into an acute care hospital** where we could treat very sick COVID patients. All the intensive care unit (ICU) rooms needed to be negative air flow rooms, and the monitors for COVID patients were different than those used for LTACH patients. We had to rewire the rooms to enable us to set up telemetry and other monitors to track heartlines, drips, and the like. What started as a family friendly hospital, with lounges and areas for art therapy, had to be completely refurbished so it could be kept as sterile as possible. For example, we ripped out all the carpet throughout the facility and replaced it with durable surface flooring.

Staffing was another challenge. We had to determine how to locate, recruit, and hire nurses and respiratory therapists, develop our own staffing models, and determine our staff to patient ratios. There was also concern about finding enough contract staff, since this was essentially a new hospital and we could not pull from our own staff. It was important to

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us that staff felt safe. To ease their fear of taking the virus home on their clothes, we made clean scrubs and toiletries available and provided lockers for staff to store their clothes so they could shower and change before going home. The system was dedicated to compensating the travelling nurses and respiratory therapists to help us staff Bethesda. We also had a core group of employees that "ran into the fire" and stayed there; we think that once they came to Bethesda and saw how seriously we were taking the personal protective equipment (PPE) and processes to keep them safe, they felt better there than they may have at other hospitals with a mix of patients and infection precautions.

Next, we had to determine how we would **safely transport and admit patients**, particularly those already on ventilators. We partnered with our emergency medical services teams to practice how do this without exposing others. We also created a new incident command structure specific to our hospital. We held twice daily calls with our (Bethesda) clinical leaders and our system's command center that allowed us to identify patients in our system hospitals who needed to come to Bethesda and address any escalating issues.

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Why cohort patients?

- Protect uninfected patients
- Give staff the choice to work with COVID-positive patients
- Provide staff the chance to specialize in this type of care
- Conserve personal protective equipment
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Once a COVID-positive patient was identified, an alert would be sent through our electronic health record system to the incident command center. The on-call triage doctor would reach out to the attending who was currently caring for that patient, and together they would decide if it was appropriate for that patient to come to Bethesda. This process took a lot of teamwork and communication.

Minnesota has a statewide patient placement structure (i.e., the Critical Care Coordination Center, or "C4") which essentially serves as an incident command for hospitals across the entire state. For example, if a rural hospital that does not have an ICU or one with limited capacity cannot find a place to send their patient, they could reach out to C4. All hospitals in the Twin Cities agreed that if they got one of these calls, they would provide a bed, no questions asked. Everyone was willing to be part of a previously competitive structure.

Early on, there was a concern that we would run out of **ventilators** and our state health officials were closely tracking their numbers in each hospital. We pooled all available ventilators from our other hospitals' operating rooms and from those where they were not being used as much to ensure we would not run out.

Next, because COVID-19 was considered an airborne virus, and many procedures our patients would need were aerosolizing, we needed to quickly **create 40 new negative airflow ICU rooms**. Our engineers accomplished this by cutting a hole in the wall of each ICU room to the outside and installing a special kind of fan to create this negative flow. We tested the negative flow every day and engineers told us what the total circulation time was before all the air had cleared out of the room. This helped keep staff safe and allowed us to conserve ventilator HEPA filters.

Photo of ventilators courtesy of Dr. Kuhlmann.

We were lucky the weather was relatively mild in MN this year. Blowing all hot or cold air out the side of a building means you would be running your boilers or air conditioners nonstop. This did challenge our facility's engineers who had to perform hourly checks on our HVAC systems to ensure we could tolerate running all these fans to push the air out of the building.

A group of University of Minnesota engineering students designed a negative airflow "hood" we could place on top of a patient while we were extubating them or performing other aerosolizing procedures without having to rely so much on the negative airflow in the room. Instead of more than 20 minutes, it took us just a few minutes to accomplish these procedures and we lessened the exposure risks for staff. It also meant that loved ones who wanted to be in the room to say goodbye after a patient was extubated only had to wait a few minutes to do so.

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Our patients were the sickest in the system and our ICUs were very noisy. Within a patient's room, you had a ventilator which makes a blowing noise, the sound of a fan pushing air outside of the hospital to create the negative airflow, and staff speaking loudly through masks and face shields; it all made communication very difficult, and we could not hear the various monitors' alarms outside of the rooms. We worked closely with the University of Minnesota's engineering department to install microphones by our pumps, which would trigger a visual alarm system that would strobe lights, alerting the one healthcare provider responsible for watching for alarms.

A lot of our staff had not used **PPE** to the extent we had to in our COVID-only hospital. Our infection control staff trained and watched our staff donning and doffing PPE to ensure they were doing it correctly; they approved each provider at both ends of the process. We also had "watchers" who circulated the ICU to ensure our team members did not miss anything when they donned and doffed their equipment. This attention to detail contributed to our remarkably low staff infection rate.

Dr. Kuhlmann helps engineering students test the negative airflow hood. (Photo courtesy of Dr. Kuhlmann)

Because we had to start from scratch and create a new ICU, we had a lot of meetings and mock drills and training with all our staff—in less than two weeks. It was not limited to providers and engineers. We also had to educate our security staff (what if a patient becomes unruly? What if a loved one shows up and wants to see a patient?) and our janitors (e.g., how to effectively disinfect high-touch areas).

The hospital system supported us and got us the materials we needed to make this happen. Having that **higher leadership involvement** facilitated the development and sustainment of the new hospital. Once we had all the supplies and tools we needed, it was more about getting staff comfortable with them.

Staff safety really was a focal point of our new hospital. Local university experts shared their expertise with us, developing ultraviolet technology, for example, which allowed us to decontaminate and preserve PPE with confidence. Some of the nurses who had to wear tight fitting masks were experiencing skin breakdown on their faces; our wound care nurses gave tutorials on how to treat and prevent further injuries. We also took staff screenings very seriously to maintain the healthiest environment possible; we pooled lessons learned and safety procedures developed by experts from around the world.

Our system had an ICU COVID working group that met once a week. This group included both our research and clinical arms. Doctors who were rotating through were sharing pearls and we continuously **updated a working guidelines document**.

I am proud of the work we did at Bethesda. The following table illustrates the care we provided for 475 patients from March through July 2020. Our ICU patient mortality was 26%, among the lowest in the country. Seven percent of our floor patients died; everyone else was discharged.

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Characteristic		Floor Patients (n=149)	ICU Patients (n=138)
Age - Median (IQR)		69 (51-83)	64 (54-77)
Race - n (%)	White	94 (66)	53 (42)
	Black	21 (15)	25 (20)
	Asian	16 (11)	28 (22)
	Other	12 (8)	18 (16)
Sex (Male) - n (%)		79 (53)	56 (41)
Total Hospital Days - median (IQR)		7.7 (4.0-11.9)	8.6 (1.3-14.7)
Ventilator Days - median (IQR)		0	5.2 (1.5-14.7)
ICU Free Days - median (IQR)[1]			17.2 (3.4-28.3)
Death - n (%)[2]		10 (7)	36 (26)

Unfortunately, we did have staff who experienced severe stress and burnout; it was pretty visible for some of them. A lot of patients did pass away and this was hard for staff. Because family could not visit, the nursing staff had to counsel the loved ones while taking care of the patient and worry about taking COVID back home to their families. We are working with our staff now that things have slowed down a bit to manage any negative mental health effects they may be experiencing.

That said, this was one of the most exciting, challenging, and innovative things I have ever been a part of. The innovation that led to the creation of this hospital and the people that came together to build it is something I will never forget throughout my career.

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