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MEETING SUMMARY

Confronting COVID-19: Finding Hospital Capacity and Improving Patient Flow

A Webinar Series Hosted by PCORI for Hospitals and Health Systems

Part 1 – Report from the Field: How We Are Managing Incident Command

March 31, 2020 and April 2, 2020

Overview

Faced with an imminent surge of COVID-19 patients, hospitals across the country are encountering enormous challenges with capacity and patient flow. Learning from clinicians, health system leaders, and operations management experts about how to manage capacity in real time can help health systems adapt to evolving circumstances surrounding the current pandemic.

On March 31, 2020, PCORI (the Patient-Centered Outcomes Research Institute) initiated this webinar series with **"Part 1–Report from the Field: How We Are Managing Incident Command."** Presenters represented health systems located in New York state, which is currently the epicenter of the COVID-19 pandemic in the United States, with about 60% of the total confirmed cases in the country. The discussion continued in a follow-up session on April 2, 2020, with representatives from systems in Virginia and Texas that are just beginning to see an exponential rise in patients with COVID-19.

Expert panels for the two webinars included the following individuals:

Speakers

- **Mark Jarrett, MD,** Chief Quality Officer, Northwell Health
- **Carol Gomes,** Chief Executive Officer and Chief Operating Officer, Stony Brook University Hospital
- **Steve Arner**, Executive Vice President and Chief Operating Officer, Carilion Clinic
- **Paul Skolnik**, **MD,** Chair of Medicine, Senior Vice President, infectious diseases physician, Carilion Clinic
- **Bela Patel, MD,** Regional Chief Medical Officer and Executive Medical Director of Critical Care Medicine, Memorial Hermann Health System, Vice Dean of Healthcare Quality at The University of Texas Health Science Center at Houston

Moderator

Susan Dentzer, Senior Policy Fellow, Duke-Margolis Center for Health Policy

Discussants

- **Eugene Litvak,** President and Chief Executive Officer, Institute for Healthcare Optimization
- **Don Goldmann, MD,** Chief Scientific Officer Emeritus and Senior Fellow, Institute for Healthcare Improvement

Webinar recordings are available at www.pcori.org/confronting-COVID-19.

Report from the Field: How We Are Managing Incident Command

Hospital leaders reported that their organizations are taking similar steps to quickly and safely prepare for and respond to increasing numbers of COVID-19 patients. Below, we provide a brief overview of the current caseload within these systems and summarize key implementation strategies.

COVID-19 Cases Treated to Date

Hospitals in New York are seeing a rapid increase in the number of patients presenting at the emergency department (ED) with the need for immediate intubation. Hospital leaders in New York stress that the number of patients has built very sharply and steeply, and they relay that health systems in other areas should prepare for the fact that a relatively small number of COVID-19 patients on one day may swell dramatically just a few days later.

- **Stony Brook University Hospital** is the largest academic medical center on Long Island. On March 31, 2020, Stony Brook had more than 140 COVID-positive patients in the hospital and another 200 patients under investigation for COVID. The hospital is seeing a rapid increase in demand for intensive care unit (ICU) beds and intubation, but peak demand as of March 31 was expected to be 7–12 days away.
- **Northwell Health** is New York State's largest healthcare provider and largest private employer, with 23 hospitals and more than 700 outpatient facilities serving New York City, Westchester County, and Long Island. As of March 31, 2020, the Northwell system was caring for 2,300 COVID-positive cases, with about 23% of those patients on ventilators.

Although not at the same stage as New York, COVID-19 caseloads in Virginia and Texas are growing, with the demand for care expected to peak in late April.

- **Carilion Clinic** is a network of seven hospitals and primary and specialty physician practices serving nearly 1 million Virginians, including individuals in very rural parts of the state. This network reported 76 cases of COVID-19 as of April 8, 2020.
- **Memorial Hermann** is a network of 17 hospitals plus cancer, cardiovascular, and sports medicine and rehabilitation facilities in southeast Texas. Cases increased from fewer than 20 in the previous week to 125 in the week leading up to April 2, 2020.

Structuring and Managing Incident Command

All hospitals and health systems set up Hospital Incident Command System (HICS) structures, following HICS procedures at least one month ago. Command teams consist of key hospital and health system leaders and are typically headed by the chief medical officer, although other choices exist. Routine twice-daily meetings address updates on the supply chain; physician, nursing, support, and ancillary staffing; surge capacity planning and progress; and communication with staff, legislators, regulators, and media, among updates on other topics.

Separate task forces work on various aspects of the COVID response, such as scouring the medical literature to identify clinical guidelines for best practices in treatment and optimization of resources, surge planning and execution, expansion of ventilator capacity, and decontamination of personal protective equipment (PPE). Local adaptations of procedures are critical to successful management and operations during the COVID-19 crisis; drawing on lessons learned from others is useful. Northwell's HICS and emergency operations teams meet virtually to minimize risk of exposure.

Expanding Organizational Capacity

Hospitals have worked to increase throughput and expand inpatient capacity to treat serious COVID cases in the following ways.

Operations

Using and repurposing all available space to manage patient flow. Hospitals are looking at a range of options to maximize space and workflow:

- All hospitals and health systems in New York State were ordered by state government to double their overall bed capacity in recent weeks. Stony Brook has expanded its inpatient footprint to the ambulatory surgery center, endoscopy units, holding areas, and several outpatient clinics, including for ICU beds and regular medical or surgical beds. Stony Brook has also identified all spaces that could have negative pressure machines installed to serve patients whose particular treatment (with BiPAP machines, for example) risks aerosolizing the virus. The Stony Brook system created a plan for staffing all these beds in a surge protocol that will flex from levels 1 to 10, in a surge ranking system cobbled together from the medical literature. The command team assesses volume and severity of demand twice daily to assess how to allocate all resources, including demand for urgent surgeries for non-COVID patients.
- Northwell has also doubled bed capacity per state mandate, along similar lines as Stony Brook, including by putting new beds into post-acute spaces. Northwell has moved postpartum patients to separate ambulatory facilities, which reduces their risk of exposure and increases the number of hospital beds to treat patients with COVID-19. Northwell has also rented nursing home space for patients who are COVID-positive and medically stable but are unable to return to their own nursing home.
- Carilion transitioned care units in its hospital from non-COVID to COVID-specific. Daily calls among specialty units help assess capacity and allocate space. Carilion's tertiary care has worked with engineers and local contractors to enable all patient rooms to be converted to negative pressure spaces if needed. Medical tents and a decommissioned hospital facility are also part of peak surge plans.
- Memorial Hermann has also added beds in multiple areas of the health system and is coordinating with the state and other Houston healthcare providers to turn a stadium into an overflow care site.

Streamlining testing centers. Stony Brook worked with the governor's office, office of emergency management, homeland security, and the department of health to create a six-lane drive-through field testing site in the university parking lot. Testing is available by appointment for individuals who have undergone triage by phone. Carilion is shifting COVID testing to dedicated sites, freeing EDs and urgent care centers. Establishing the dedicated sites requires coordinating with construction and information technology (IT) teams, as well as with the primary care workforces, to staff the sites.

Creating a forward triage process. Stony Brook has set up a triage tent adjacent to its field testing site, where ED physicians and nurses direct the most seriously ill patients to the ED, refer other patients to the testing tent for quicker access, and redirect less urgent cases to other intake locations. This one key move is credited with reducing overload into the ED.

Canceling elective surgeries. Canceling elective surgeries has helped all four systems free up treatment beds and staff, including anesthesiologists who can direct repurposing of anesthesia machines for use as backup ventilators, if needed. Northwell and Carilion both established committees to review which surgeries are nonessential and which surgeries are essential, considering the risk of COVID exposure for patients. A Virginia state order canceled all nonessential surgeries through April 24, and it is likely that Carilion will continue past that date based on modeling of peak/surge dates. All systems are still conducting reduced numbers of urgent surgeries, such as for cancer.

Designating COVID-only care areas. Hospitals are creating separate treatment areas for patients who have tested positive for COVID or who are under investigation for COVID. Carilion created separate areas for patients who are COVID-likely, COVID-suspected, and COVID-positive to maintain flow in the ED. Hospitals are also treating patients with similar care needs on the same floor to minimize exposure. Northwell created separate radiology units, with dedicated staff for patients with and without COVID, to create efficiencies in cleaning and PPE use. Carilion's labor and delivery services are in a separate section of the hospital, and hospital teams worked with department chairs to limit visitors and identify aerosolizing procedures that may require PPE.

Minimizing exposure risk. To minimize exposure risk, telehealth has expanded to clinic visits, which, in turn, helps reduce system burden and preserves PPE. Northwell has moved all staff who do not have to be on-site to provide care while telecommuting when possible. Planning for telework requires preparing both IT support and staff for changes related to telework. Systems need enough available laptops as well as the data security systems to support remote work with personal health information and HIPAA (Health Insurance Portability and Accountability Act) regulations. Carilion has altered its test ordering schema so that tests are prioritized to help open beds for the anticipated surge and to preserve the workforce through early return to work for hospital contacts. Stony Brook has centralized telemetry monitoring across buildings.

Staffing

Reallocating staff. Health system labor pools have shifted as ambulatory clinic visits have declined. However, hospitals do not have enough intensivists to care for all patients in the expanded ICUs. Northwell has brought in anesthesiology and surgical intensive care staff to care for patients with COVID 19. Northwell has also changed nurse staffing ratios for its ICU beds—from one nurse for every two patients to one nurse for every three patients or more—and is developing buddy systems, in which several floor nurses support one critical care nurse. Memorial Hermann found, however, that new teams take time to learn to work together efficiently, for example, in planning how a team can reduce the number of procedures in patient rooms so that fewer team members require PPE. Forming teams ahead of peak demand and spending time on team building can help improve efficiency during surge.

Carilion uses an enterprise-wide staffing command center to reallocate staff from clinics with reduced volume to facilities where demand has increased, as well as to coordinate responses to staff exposure to the virus.

Providing multidisciplinary support. To relieve pressure on busy ICU teams, Memorial Hermann is building palliative care and hospice personnel into all ICU units to talk with families about end-of-life issues. Similarly, Stony Brook staffs these patient care areas with palliative care specialists. Case managers and social workers work closely with home health providers to coordinate resources for discharged patients.

Supplies

Innovating locally. At Stony Brook, IT teams use 3D printers to produce face masks and ventilator parts. Carilion is working with Virginia Tech to test ventilator alternatives and to print face shields and clear acrylic box-shaped shields that can be placed over patients during aerosolizing procedures. Stony Brook's chemistry department is manufacturing hand sanitizer. Extension tubing for IV poles allows staff to change IVs without requiring PPE to enter patient rooms.

Reusing and recycling. Stony Brook and Memorial Hermann are investigating methods to disinfect N95 masks using vaporized hydrogen peroxide, and Northwell has provided staff with breathable bags to store and reuse their N95 masks, per Centers for Disease Control and Prevention guidelines. Stony Brook has assembled an oxygen tank farm to increase reserves of oxygen supply. This large system of tanks enables storage of three times more oxygen.

Communication

Helping families communicate using technological devices. Because hospitals have implemented no-visitor policies for most patients, iPads are helping patients communicate with family. However, implementing such programs requires that the hospital networks

can handle the capacity and that Wi-Fi bandwidth is adequate and accessible in the care units.

Partnering with vendors to provide interpreter services. COVID can also pose a challenge for meeting patients' health literacy needs and providing language interpretation, especially in new or improvised work sites. Hospitals are working with vendors to enable phone-based interpretation.

Planning for Surge Peak and Beyond

As noted previously, under state direction, all New York hospitals have been asked to double their preexisting bed count to create surge capacity. Stony Brook and Northwell are working closely with the governor's office and state emergency management systems to plan for surge demand. As of March 31, both New York hospitals rated themselves as level 6 to 7, on a scale of 1 to 10, of surge planning, where peak surge (level 10) would include using all alternative sites for care, inside and outside hospitals. Carilion and Memorial Hermann are making surge plans that account for the trajectory of COVID-19, with about 16% of infected patients requiring hospitalization and 40% of those patients requiring ICU care and ventilator support lasting two to four weeks, followed by medical care.

Tracking anticipated volume. Daily tracking of utilization data such as admissions, use of ventilators and anesthesia machines reconfigured to serve as ventilators, occupied ICU beds, discharges, and deaths is crucial for all systems. State health departments and national data modeling efforts can help local hospitals plan for their own expected volume. Two open-source resources are the Localized COVID-19 Model and Scenario Planner and the University of Pennsylvania's COVID-19 Hospital Impact Model for Epidemics. In-house statisticians actively review available data on the number of positive tests per day; number of persons under investigation for COVID; number of patients intubated per day; mortalities; and a variety of other data points, including age and comorbidities, and use predictive models to determine where the hospital is on the COVID-19 infection trajectory or curve.

Increasing staffing. Other strategies to manage the surge of COVID-19 patients include credentialing non-ICU physicians for ICU privileges, moving hospice patients who do not require monitoring to nontraditional locations, and contacting nurses and physicians who retired in the past five years to ask them if they are willing to return to work during the pandemic. Stony Brook is positioning returning staff based on their skill sets and on where they volunteer to serve.

Anticipating step-down care. If necessary, Stony Brook is ready to use ventilators that have been retrofitted for use with two patients rather than one patient. Memorial Hermann is planning to maximize its own ICU and ventilator capacity but also is looking ahead to patients' needs as they step down from ICU but still require medical care. Plans include centralizing COVID-related ICU care at larger hospitals once demand subsides and

stepping down noncritical patients from ICU to medical or recovery units in smaller hospitals or the system's orthopedic hospital.

Stony Brook has grouped patients on comfort care and hospice care, with these units staffed by palliative specialists.

One challenge for both Carilion and Memorial Hermann is placement of nursing home residents. Local nursing homes have required two negative COVID tests before agreeing to let residents return, even if the residents were hospitalized for non-COVID reasons. This policy places a burden on test kits, which are in short supply, and beds, which will also be needed throughout the surge. The systems are working with state health officials and are exploring options to negotiate for different testing rules or care locations to free up resources for active COVID cases. In at least one instance, Carilion was able to negotiate successfully with one nursing home to cut the number of required negative tests from two to one before the facility would allow a resident to return.

Learning from others. Hospitals are connecting with providers in Italy, Spain, New York, and other hot spots to understand how to better triage patients and manage surge. As a rule, they have not used or been successful in obtaining such information from China. Hospitals are also assessing disaster planning procedures to apply learnings from prior catastrophic events.

Supporting Staff

Hospital staff face the stress and anxiety of risk that they or colleagues will become infected with COVID, and they may experience grief from the loss of colleagues, friends, or family members. Many hospital staff members are or will be isolating from family or dealing with additional challenges at home, such as childcare or caregiving for other family members. These stressors add to the challenges of mental health needs or burnout that staff may already be experiencing.

Providing support from management. Support strategies include having hospital leadership conduct executive rounding or walk the floors to normalize seeking help for stress and encourage staff to take advantage of Employee Assistance Programs or other mental health services. Crisis management teams, telehealth programs, chaplaincy support, and virtual meditation spaces can help.

Providing early, extensive training. Early and extensive training for staff, such as training related to overuse of PPE in situations where it is not required, can also help reduce anxiety and reactions to anxiety. Staff across hospitals and in related services such as EMS also need extensive training on the virus and minimizing exposure. Carilion's infectious disease specialist conducts grand rounds at each hospital in the system, and the academic medical center's infectious disease department has established a hotline for other hospitals in the system, particularly for rural and critical access hospitals.

Prioritizing testing staff who have been exposed. Limited supplies have affected Carilion's testing strategy. The system has prioritized persons under investigation for suspected COVID and also staff who have had exposure and might need to isolate.

Celebrating successes. Making note of victories can help staff feel that their work is not futile in the face of the pandemic.

Internal Communication

Staff communication is an essential part of emergency operations. Stony Brook and Northwell reported sending daily e-mails and posting blogs from the chief executive officer and intranet updates on COVID statistics, staffing plans, and new information about policy changes, PPE, or other resources. Setting daily cycles, such as staff updates in the morning and management in the afternoon, can help increase continuity of information.

Even before peak surge, Carilion and Memorial Hermann found that communication, especially frequent rounding on the floor by executive teams (taking into account limitations from the COVID-19 situation), is essential for learning about and addressing problems and encouraging staff to use an employee hotline for support. Extra human resources support and use of Employee Assistance Programs has helped address employee questions about how particular aspects of the COVID-19 response affect their work or their lives.

Reducing Practice Burden

Some standard aspects of health care, such as compliance with nurse documentation, has been scaled back at New York hospitals because of the demands on nurses' time.

At Memorial Hermann, consent for treatment now is collected verbally and is documented by nurses to reduce the use of paper, pens, or tablet computers that might transmit the virus. Carilion is also asking patients to complete intake forms online, ahead of visits.

To minimize contact with staff and optimize resources, hospitals are also rethinking whether patients require daily chest x-rays.

Lessons Learned

Start early. It pays to have a command structure that operates well. However, it takes time for incident command teams to learn what works and to identify problems as well as solutions. Employ team-based training early to help staff who are not accustomed to working together communicate and function well. Start executive rounding early to listen to staff concerns and help reduce anxiety but be mindful that this process can take longer than expected.

Innovate and adapt. Continually reassess needs and encourage creative thinking and ingenuity among all members of the team. Brainstorm solutions and compare them against the evidence-based literature when possible.

Frequently communicate and emphasize care and safety for staff. Daily internal communication should include links to available resources. Knowledge about the virus and guidelines about appropriate patient care are changing daily, and it is crucial to have knowledgeable people searching the literature and staying abreast of needed changes that should be communicated to all staff. Acknowledge that this is an unprecedented time. Celebrate the fact that staff are coming together for patients and for their teammates.

Communicate early and actively with the public. Outward communication should emphasize practices that reduce risk of spread, such as social distancing and hand washing. Some serious non-COVID conditions, such as possible stroke or heart attack, do require immediate emergency care, yet most hospitals at the epicenter of the COVID outbreak have experienced a sharp drop-off of conventional urgent and emergent care patients. Communities should be alerted that patients who believe they are in emergent situations should still come to hospitals, rather than to urgent care facilities or other places less well equipped to handle these situations. At the same time, many hospitals are advising people who are immunocompromised to avoid the ED, if possible.

Find community partners. Partner with community, political, faith-based, and other cultural leaders, and use public service announcements to help get the word out to help reinforce practices that can reduce peak demand. Hospitals noted that community members have come together in various ways to support the hospital and staff by supplying food, forming stitching groups to increase mask availability, and donating philanthropically.

Be aware of inconsistent guidelines. Many professional and specialty societies have issued guidance on optimal strategies for reducing exposure. However, those guidelines may not reflect the challenges of limited supplies or heavy demand. Work with department heads and community health partners to establish standards that reflect best practice but also the local situation.

Establish guidance on care intensity. Patients who suffer acute respiratory distress syndrome have a high risk of mortality. Guidance can help staff understand how best to care for these patients.

Hope for the best, but prepare for the worst. A second peak of infections is likely in the fall, meaning plans and procedures that work now may be needed again.