PERSPECTIVES

Augmentation of a Hospital Incident Command System to Support Continued Waves of the COVID-19 Pandemic

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Abstract: Stamford Hospital (SH) is a 305 bed Level II Trauma center located in Fairfield County, the epicenter of the coronavirus disease 2019 (COVID-19) pandemic in Connecticut. The COVID-19 pandemic was a fast paced, rapidly evolving crisis, presenting our leadership team with unique challenges related to resource availability, patient care, and staff safety. The existing Hospital Incident Command System (HICS) was activated in March 2020 to coordinate our operational emergency management planning, response, and recovery capability for this unplanned event. Although HICS lays the groundwork for hospital preparations and protocol implementation, it is not designed to withstand prolonged crisis circumstances. Given the conditions that the COVID-19 pandemic presented, the possibility for future waves became an impending reality, prompting the need for a long-term solution. To establish guidelines that promoted balance between necessary preparations in the case of additional surges of the pandemic and concurrent resumption then maintenance of routine hospital operations, the SH COVID-19 Playbook was created. The Playbook, presented here, is arranged in accordance with the evidence-based 4 S's (Space, Staff, Systems, and Stuff) strategic critical care planning framework, to address surge capacity management within our hospital's four main patient care areas and additional supportive services. Through feedback from frontline caregivers and leaders within SH, the Playbook captures our experience, best practices, and insight acquired during the first wave of the pandemic. Established with the intentions of equipping leadership and staff globally, guidelines are presented to aid in the navigation of future pandemic surges and successfully care for COVID-19 patients, ensure staff safety, allow for normal services to operate, and provide optimal communication and support for the community, patients, and staff.

Keywords: COVID-19, Hospital Incident Command System, surge capacity, emergency preparedness, healthcare leadership, critical care guidance framework

Background

The emergence of COVID-19 has caused unprecedented challenges for healthcare systems internationally. Hospital emergency preparations for events of this nature incorporate the implementation of a Hospital Incident Command System (HICS) which exercises supplementary oversight to guide the hospital through crises. Simultaneously safeguarding system processes, staff, and patients while maintaining their institutions' core mission and values is paramount.[1]

HICS was established by the California Emergency Medical Services Authority,[2–5] allowing for common terminology and coordinated leadership decision-making, encompassing all phases of emergency response efforts in collaboration with stakeholders such as community leaders, frontline staff, and executives.[1,6] HICS is grounded on the same principles as the Incident Command System (ICS) component of the National Incident Management System (NIMS), with HICS guiding hospital systems on response and recovery management for disaster events.

Healthcare leadership uses incident management principles regularly for Emergency Department (ED) surges, resource and staff scarcity, mass casualty events, with systems then resuming routine services after the emergency

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event.[7,8] Nevertheless, the COVID-19 pandemic was drastically different than previous crisis encounters, demanding intense and long-term decision-making for executive leadership beyond those typically guided by HICS.

Setting

Stamford Hospital (SH) is a 305 bed Level II Trauma center located in Fairfield County, serving one of the largest cities in the state of Connecticut (CT). Due to the proximity to the New York (NY) metropolitan area, our county was inundated with COVID-19 infections. On March 11th, 2020, our community-based teaching hospital's first COVID-19 patient was admitted. The first Intensive Care Unit (ICU) admission occurred within 48 hours, and we reached our peak inpatient census of 151 patients, including 61 ICU admissions by April 14th, 2020. The extent of the impending surge of critically ill patients was unknown and experts cautioned of an international threat due to COVID-19's precarious and unknown virulence, with the potential to overwhelm healthcare institutions globally.[9]

Battling the First Surge

HICS was officially activated on March 9th, 2020, as SH entered the critical response stage,[5] with executive leadership meeting at least three times per week to review the current state of the pandemic and its current effect on the healthcare system at large. As part of the HICS planning phase,[10] a COVID-19 Response Planning Team was created and responsible for continued and ongoing surveillance of cases within the community and the hospital, as well as monitoring the operational aspects of caring for COVID-19 patients system wide. The Team met daily or weekly and was responsible for activating the full HICS response if triggered to do so. Table 1 outlines the standing agenda of these meetings and topics addressed.

HICS command members comprised of leadership and caregivers across the organization, such as the Executive Team and key clinical and operational leaders. Once activated, command members met based on the Incident Commander's recommendations and were responsible for: reviewing current data, providing public health and medical updates to stakeholders and the community, assessing operational and logistical needs, and addressing staff well-being.

Expanding Bed Capacity

While our newly constructed patient rooms among all units and floors were developed as single patient rooms,[11] leadership decided it was best to double room occupancy among two of our general medical floors to ensure that proper isolation and bed availability were achieved via the use of COVID-19 and non-COVID-19 care zones. These procedures and novel workflow changes have been cited in the literature as best practices and strategies implemented internationally,[12–14] although taking place at large medical centers with additional resources and organizational surge capacity.

Table 1 Agenda Breakdown for COVID-19 Response Planning Meetings

Public Health / Policy Translate public health / practice guidelines Review federal, state, and local mandates	**Analytics** Establish critical measures and capacity Report in real time via COVID-19 Dashboard
Operations Operationalize new units and cohorted areas Implement clinical policies	**Planning** Implement new testing capabilities Develop new units, alternate care sites
Materials Adjudicate personal protective equipment Monitor medical equipment	**Staffing** Recruit and onboard external personnel Integrate medical staff in revised roles
Employee Health Define testing, quarantine, and isolation protocols Maintain employee well-being	**Other** Emergency medication use and clinical trials Communicate with media and regional/local community

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Knowing that we had limited capacity and that some of our patients no longer required acute inpatient services but could not return home, the decision was made to open an Alternate Care Site (ACS) using our old, decommissioned hospital building on the same campus as the new hospital. The teams moved quickly to reactivate a designated area of the old hospital as beds and equipment were required as well as the necessary technology to support the continuation of care. The National Guard staffed this unit, which would be open to internal transfers from Stamford Health as well as neighboring healthcare organizations that needed a place to send discharged patients.[15–17]

Workflow Augmentations

Guidelines and workflows were established by executive leadership to standardize our infection prevention and control practices during procedures that might expose staff to the virus.[10] Each workflow that was new or altered required collaboration and buy-in from clinical staff, and non-clinical staff to adequately and efficiently care for infectious patients, such as transporters, dietary and housekeeping. Other departments that provided essential input on these workflows included Information Services (to ensure we had the right technology in each new room and ensuring it was reflected in our Electronic Medical Records (EMR)), Facilities (to ensure the right equipment to care for these patients were being set up on the newly created COVID-19 units), Materials Management (to ensure all staff that were entering patient rooms wore the correct Personal Protective Equipment (PPE)), and Pharmacy.

As the global pandemic was quickly spreading, it became apparent that we needed to rapidly provide valuable data and insights to leaders and colleagues. In highlighting systems that were created or altered during the pandemic, it is important to mention our COVID-19 dashboard and various teams required for successful implementation of our augmented workflows and protocols.

By early April, staffing shortages, resources, and visitation restrictions were key stressors for our leadership team. Planning meetings during this time focused on augmenting the hospital's infrastructure, as the COVID-19 positive patient population had to be safely isolated, thus creating entirely new or altering existing workflows. Every clinical area required at least one or multiple new patient care processes, which were continuously being modified, sometimes several times a day. Because many of our COVID-19 units were impromptu creations, such as standing up additional ICUs and converting private rooms to semi-private rooms, workflows needed to be established on how to do this efficiently and effectively.

Surveillance

Tracking and forecasting COVID-19 related data points was vital when monitoring staffing levels, available beds, equipment, and supplies. Using our current technology, HICS leadership and National Guard staff worked with our Analytics & Innovation (AI) team to delineate and locate the data sources required to populate our COVID-19 dashboard (Figure 1). Surveillance of important metrics and census levels were already built within our system's EMR, as some data points are for more than just our main inpatient health records system, a similar response strategy used by large medical systems.[18]

On March 29, 2020, the United States (US) federal government required hospitals to submit daily data reports to understand the burden, capacity, capabilities, and number of patients hospitalized due to COVID-19.[19] Our "all-hands-on-deck" approaches for this top priority task enabled us to create and test these new data sources in hours as opposed to weeks. Staffing levels, testing, and positivity rates were metrics captured by SH's Employee Health department and displayed within the dashboard. Important metrics were continuously added to the dashboard based on the necessity to track items such as oxygen levels per room and supply inventory for both our system and when reporting to local and regional partners. New resources included a Teletracking system that displayed the inpatient positivity status, location of admission, and pertinent care information.

Much about the novel virus remained unclear to healthcare leaders, including if and when crisis proportions would be reached.[20] Efforts to monitor the national and global rates of morbidity and mortality were complex due to the lack of uniformity in reporting in care settings. Requiring only one link for full integration, the John Hopkins COVID-19 surveillance dashboard was added as an additional planning tool to view the ever-changing global, national, and state trends.[21]
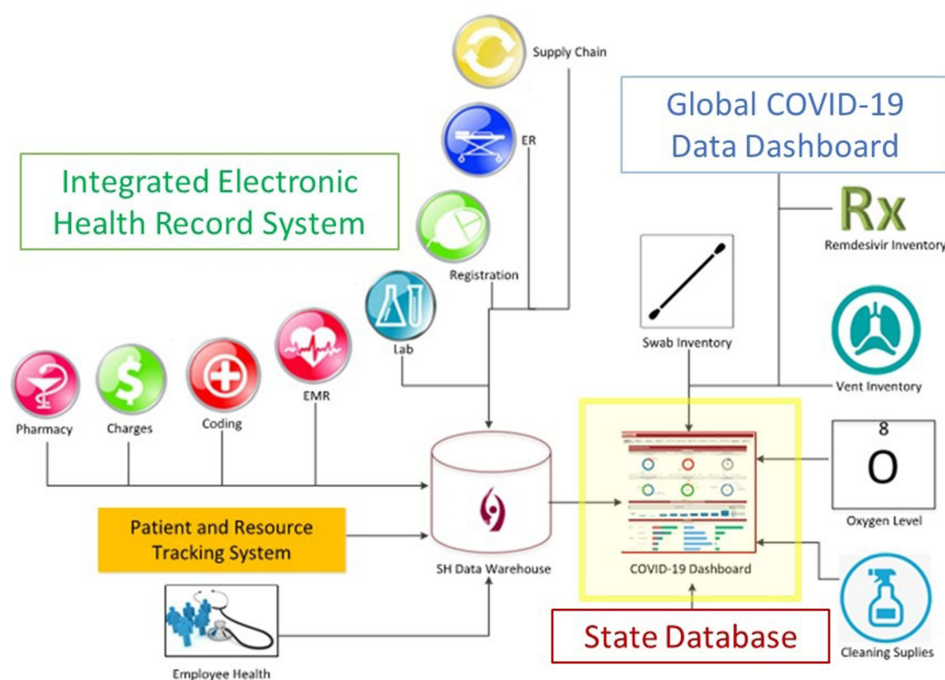
Figure 1 Data sources specifically created for SH's COVID-19 Dashboard.
Abbreviations: ER, Emergency Room/Department; EMR, Electronic Medical Records; Vent, Ventilator; SH, Stamford Hospital.

Support Services

Early on, the clinical treatments and procedures guidelines were recognized as first line, but when new recommendations and/or treatments failed to reduce morbidity, command members were required to make rapid protocol changes, similarly experienced among other institutions when battling the first surge.[22–24] For example, initially recommended medications for COVID-19 treatment, such as hydroxychloroquine and lopinavir/ritonavir were swiftly proven ineffective and thus no longer a frontline treatment for inpatients.[25] During the month of March 2020, while 89% of the ongoing clinical trials in the US paused enrollment due to the pandemic and related visitation barriers,[26–28] SH was one of the first sites in the US to obtain approval for Convalescent Plasma treatment. Once further treatments were approved through the expanded access program, they were added to our existing treatment protocols.

Moreover, when visitation was halted and to further support our ICU staff, a novel Family Liaison communication team was established to provide families status updates on their loved one admitted to the ICU, with other hospitals establishing similar ICU family communication teams.[29–31] Liaison's increase capacity for ICU staff to focus on their complex patient care duties to alleviate their workload while still delivering a family-centered approach in palliative communication. The organization's existing Cardiac Surgery Patient Navigation Workflow was adapted to train and recruit staff volunteers for the program and was initiated in under two weeks.

Additionally, to help shorten the hospital stay of COVID-19 patients requiring oxygen without compromising a safe discharge a comprehensive, multi-disciplinary home oxygen outpatient program was established. Prior to the pandemic, SH did not have an established post-discharge oxygen program. Leadership collaborated with an oxygen supplier, enabling us to purchase and provide portable pulse oximeters to these patients upon discharge. Before discharge, patients were educated and trained on proper home utilization. Follow-up and monitoring was provided by a designated Case Manager, who communicated the patients' status with the care team.

The Ongoing Pandemic Response

Pandemic management focuses on minimizing the short and long-term impact on health systems utilizing emergency operation guidelines.[32] Important considerations include social distancing and strict cleaning measures, developing extensive workforce and community testing, implementing novel treatment measures and ensuring that adequate PPE and critical care equipment are readily available.[33–35] However, uncertainty of the pandemic's surge potential, future pandemic waves, supply chain projections and the general novel and hazardous healthcare environment made it evident to executive leadership, critical care stakeholders, and patient care leaders that the HICS emergency response preparations were not sufficient to sustain the extended wave of the COVID-19 pandemic, similarly reported by both large medical centers and smaller healthcare systems.[22,24,36,37] Lacking established response guidelines or treatment protocols to withstand the novelty and intensity of the circumstances required rapid decision-making on innovative system-wide emergency response plans, without knowledge or sufficient preparations for what was to come.

Development of the COVID-19 Playbook

A solution was crucial to provide transition points for long-term responses, prompting the creation of the SH COVID-19 Playbook (Table 2). Specifically designed by SH's AI Team, the Playbook assists leadership and staff in the response to an additional surge in COVID-19 cases, while maintaining our ability to sustain normal and routine clinical and support operations. Essential protocols are defined to guide a sustained census period as well as during de-escalation of subsequent waves. The Playbook is structured to include pertinent information, inclusive of organizational triggers, incident command center infrastructure, emergency and critical care services, alternate care sites, testing capacity and capabilities, communication strategies and the responsibilities of supporting departments.

The 4 S's: Space, Staff, Systems and Stuff surge capacity framework[32,38,39] allowed for integrated healthcare delivery versus the typical disease-specific vertical approach, while simultaneously identifying resources and potential gaps in our

Table 2 COVID-19 Playbook

	Space	Staff	Systems	Stuff
Emergency Department	• Capacity is increased via +10 hallway beds, which are only utilized for stable, non-COVID-19 patients. • If volume > 60% for 5 days, open a NPWA for rapid treatment and discharge. • If volume consistently runs at <30 patients/day, pull staff from ICC to main ED. • Establish military tents external to ED triage area. • Implement and create space for Point of Care Testing including rapid COVID-19 tests. • All results should be read within the ED, prior to inpatient transfer for appropriate patient placement. • Create and use specialized color-coded signage for positive and rule-out COVID-19 patient rooms.	• Defer to regular ED staffing schedules unless the NPTA is activated. • Reassign 2 techs, 1 CA and 2 RNs to the ED. • When an ED Forward Triage Area is opened, allocate +1 MD, RN, ED tech, Security Guard, Transporter, and Registrar. • Meet with response teams and establish ED command leaders. • Intubation Teams are initiated when the vent census is > 20 (based on patient acuity) or when +10 vents are used within 48-hours. • Continuously educate EVS staff on using UV disinfection equipment and end-of-day terminal cleaning procedures.	• Rule-out COVID-19 patients are prioritized via negative pressure room availability. • Consent is obtained using the Telephone Registration process via an iPad. Forms automatically transfer to Registration Department. • The COVID-19 hotline remains open for general calls and those who have an order are able to transfer themselves to the Lab Appointment line. • Exam rooms require end-of-day terminal cleaning via UV disinfection at least once every 24 hours. • UV disinfection post terminal cleaning if there are no patients waiting for an available exam room.	• Admission beds used instead of stretchers. • Remove code and respiratory carts. • Supply Chain Distribution Staff is responsible for PPE instead of managers. • Point of Care testing is increased via additional testing machines for COVID-19, flu, and strep, with results available in the ED. • Use pre-bundled packs of supplies and ADL care items to better cluster care. • UV machines cycle on either side of the patient stretcher for 5 minutes per cycle resulting in an additional 12 minutes of cleaning time.

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Table 2 (Continued).

	Space	Staff	Systems	Stuff
Critical Care Unit/ ICU	- Open expansion unit when all 30 CC beds are full. - When the expansion units are at capacity, turn the Cath Lab and the general medicine unit into the ICU-2 and IMCU-2 (High Flow Unit), respectively. 30 total ICU beds between the 4 units: 6 beds in negative pressure rooms and 24 IMCU beds. - Coordinate and collaborate with facility and IT departments when augmenting space. - Establish a workflow for a two-way flow of patients. - Designate space for don and doff stations. - Create and use specialized color-coded signage for positive and rule-out COVID-19 patient rooms.	- The Float Pool is backfilled with med/surg nurses and further supplemented if other procedure areas (Cath Lab, Perioperative Services) are not in use due to procedure cancellations. - ICU Medicine Team includes Intensivist, NP and IM Residents: covers 14 ICU patients. - Surgical Team includes Attending and Surgical Residents: covers the additional 6 ICU patients. - Family Liaison Program begins communication with families instead of ICU care teams. - Proning Teams activated.[a] - Delegate staff member for Critical Care Commander.	- Reduce EMR documentation if ICU-2 opens, or if non-CC resources are deployed (whichever occurs first). - When ICU-2 opens, all newly admitted COVID+ CC and Open-Heart patients are admitted to ICU-1. - Triage patients 2x a day for potential transfers to lower level of care. - If ICUs are at capacity, ED CC patients are transferred to external ICUs, rather than transferring patients within ICUs that could be transferred out. - Email updates to Stakeholders on vent census and projections. - If regional acute care hospitals experience system strains, transfer patients to SH's ICU via the DASH Program.	- COVID-19 Ventilatory Allocation Policy establishes guidance and procedures to follow when patients require MV. - Par level increases. - Drug shortage emails are sent 2x a week - Carts with wheels are deployed to organize PPE and provide staff with a donning and doffing station. - Monitor oxygen levels, PPE, staffing ratios. - Prepare and update patient status forms for Family Liaison Program communication with families. - Install HEPA filters in each patient room. - Use pre-bundled packs of supplies and ADL care items to better cluster care. - Reallocate scarce resources to those who will derive the greatest benefit and/or make the least demand on available resources.
Medical/ Surgical Unit	- On the Med/Surg units, there is a need to convert rooms from single to double occupancy. - Required resources include two beds, phones, call bells, suction and oxygen setup, wheeled computers, and iPads. - Inpatient oncology floor remains as private oncology patient rooms. - Rule-out patients can be cohorted on same unit, but not same room. - If Perioperative Services and surgery volume is reduced or halted, an additional Med/Surg unit is determined. - One day of lead time needed when converting rooms from single to double occupancy. - Create and use specialized color-coded signage for positive and rule-out COVID-19 patient rooms.	- Med/Surg units function at a 1:4 RN ratio, 1:6 CA ratio, 1:36 UC ratio and 1:36 CC/Charge RN ratio. - To improve continuity and clustering of care, and decrease PPE use, CAs work 12-hour shifts instead of 8-hour shifts with LPNs working as CAs. - Nursing leadership compiles a list of available staff and competencies to be referenced. - To limit the amount of people entering and exiting COVID+ patient rooms, supportive positions is used: COVID-19 Clinical Support Staff and Supervisor Assistant. - Utilize a second unit coordinator when entering a crisis state.	- Informational calls with middle management and nurse managers occur daily and weekly. - Unit huddles occur daily, nursing rounds continue virtually 3x/day. - Streamline EMR Documentation. - Electrophysiology providers conduct routine readings for non-cardiology or ICU patients to determine tele needs. - Tele boxes can be removed without a renewal order. - Initiate a Home Oxygen Monitoring Program for patients ready for discharge but require oxygen or home monitoring. - Live links to new workflows and proper discharge locations within playbook.	- Purchase and set up two glucometers per pod, IV pumps, dual oxygen regulators, EPA approved critical antimicrobial products, and increase par levels of gowns on units. - PPE Team is deployed when disposable isolation gowns are reduced to <60 days on hand. - Implement the use of reusable isolation gowns using the same staff as initial surge. 12 don/doff tables and use of pre-bundled care items. - Use pre-bundled packs of supplies and ADL care items to better cluster care.

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Table 2 (Continued).

	Space	Staff	Systems	Stuff
Alternate Care Site	• The ACS is used for COVID-19 patients post- hospital discharge. • Opens during Critical Stage of Response. • Unlike the initial surge, half of our old hospital, previously decommissioned but on the same campus, opens first, with 32 beds available. • If additional beds are needed, the other half of the decommissioned hospital will be the next unit to open, if staff is available.	• The plan to staff the ACS is created by utilizing *current resources* from the hospital or the labor pool, especially those with existing training in specific roles. • Requires 24/7 support of ancillary departments. • Unit Coordinator role is implemented when census reaches 6 patients. • Labor pool is used if current staff are unable to transfer.	• Prior to ACS activation, FM requires a 7-day lead time to evaluate if all infrastructure systems are operational, including: Air and water testing and sampling, obtaining medical gas and air certifications and scheduling inspections for approvals. • Utilize ACS for internal transfers only. • Supplemental staffing may be required from travelers or Military support. • Utilize a transfer system such as SH's DASH Program.	• Inventory non-COVID-19 units and transfer remaining beds to the ACS. • If the hospital does not have the necessary bed inventory, MM works with vendor to source rental beds. • Use pre-bundled packs of supplies and ADL care items to better cluster care.

Note: [a]Data from Elharrar et al.[60]
Abbreviations: ACS, Alternate Care Site; ADL, Activities of Daily Living; CA, Clinical Assistant; Cath Lab, Catheterization Laboratory; CC, Critical Care; COVID+, COVID-19 Positive; DASH, Direct Admissions Stamford Health Program; ED, Emergency Department; EMR, Electronic Medical Record; EPA, Environmental Protection Agency; EVS, Environmental Services; FM, Facilities Management; HEPA, High-Efficiency Particulate Absorbing; ICC, Immediate Care Center; ICU, Intensive Care Unit; IM, Internal Medicine; IMCU, Intermediate Care Unit; IT, Information Technology; IV, Intravenous; LPN, Licensed Practical Nurse; MD, Doctor of Medicine; Med/Surg, Medical/Surgical; MM, Materials Management; MV, Mechanical Ventilation; NP, Nurse Practitioner; NPTA, Negative Pressure Treatment Area; NPWA, Negative Pressure Waiting Area; PPE, Personal Protective Equipment; RN, Registered Nurse; SH, Stamford Hospital; UC, Unit Coordinator; UV, Ultraviolet.

planning and response efforts. The surge capacity framework defines and incorporates healthcare crisis responses for conventional, contingency, and crisis phases, pertaining to space, stuff, systems, and stuff.[10] Threats to sustain normal operations are evaluated by leadership and the HICS Planning Team on a case-by-case basis, and when entering a critical stage of the pandemic, evaluating staffing needs, current professional and federal guidelines on clinical operations, and supply chain projections is recommended.[39] Determining and planning for adjustments that may be required to ensure the continuation of our normal operating procedures is pivotal and advised.[39,40]

The SH COVID-19 Playbook is organized by the 4 S's and based on lessons learned during the first wave of the pandemic within SH's four main patient care areas. To adequately guide leaders in pandemic management, SH's COVID-19 Playbook details concurrent activities to be taken during subsequent surges.

Support Services
Staff
Hiring and onboarding supplemental staff is guided by the critical care staffing models,[10,39] requiring novel inter-departmental and external collaborations, including the human resources (HR), nursing, and Information Security departments expedited clearance processes and instituting badge and network access privileges. When surging, nursing leadership designates a point person for onboarding, along with the division of the HR departments to allocate work groups based on individual strengths (COVID-19 team and day-to-day team). We partner with travel agencies who honored a short-term pandemic specific contract, helping to create "COVID-19" offer letters, and recruit staff. A separate Central Staffing Command Center is activated as soon as critical numbers are reached in each unit to manage the hiring and onboarding process of the clinical labor pool/travelers while HR manages the non-clinical labor pool. High school and college volunteers work throughout the hospital including in our ED. Planning teams determine when the volunteer program should halt all in-person volunteer activities, with an all-staff email sent alerting departments of this necessary change.

Marketing and Communications
Based on feedback after the initial surge, many novel communication and marketing strategies are incorporated into the Playbook. To improve the provision of pertinent information on the rapidly changing healthcare situation, leadership hosts live Town Hall and Q&A sessions on clinical, operational and staff well-being. Our new COVID-19 internal and

external websites, house pandemic related materials and resources, to facilitate the provision of updates to staff and community members regarding the latest guidance and policies.

Partnerships

One example of regional partnerships includes SH's Fairfield County Incident Command Collaborative (FCICC). The FCICC creates the broad and ongoing planning and policy considerations at the level of the Connecticut Hospital Association and state government. The FCICC was established early in the pandemic course to promote collaboration in preparedness, resource management, staffing, and patient care. Assisting and guiding patient transfers, optimizing resources to support the most critical needs across the region, and sharing the same operating protocols to ensure a collaborative environment to best meet the needs of our patients and communities continues to be a best practice. Core activities include sharing data on resources such as PPE, ventilator usage, staffing levels, inpatient census, and the development of clinical protocols when necessary.

During a surge, FCICC commanders organize safe and pre-defined routes when transferring medical and ICU patients between hospitals in the context of constantly changing bed availability and incident community level surges. We continue to communicate and work with key external organizations including local and state governments and health departments, skilled nursing facilities and hospital associations in CT and Greater NY.

Pandemic Decision-Making

There was a need for actionable tools for clinical decision-making to ensure consistent equitable care practices. SH established a mechanical ventilator allocation policy if another surge or public health emergency creates demand for ventilators that outstrips the total supply at SH. The allocation policy, guided by the literature, is enacted if ventilator capacity is, or will shortly be, overwhelmed despite taking all appropriate steps to increase the surge capacity to care for critically ill patients.[41] The allocation framework is grounded in ethical obligations that include the duty to care, the duty to steward resources to optimize population health, distributive and procedural justice, and transparency.[39] Allocation is based on available objective medical evidence and individualized patient assessments. The policy describes 1) the circumstances and process of instituting and terminating the ventilator allocation protocol; 2) the creation of Triage Teams to ensure consistent decision-making; 3) allocation criteria for initial allocation of ventilators; and 4) reassessment criteria to determine whether ongoing provision of scarce ventilators are justified for individual patients.

Discussion

The first surge of COVID-19 patients required the global community to implement and escalate disaster plans, not knowing these plans would soon be proven incapable of handling the impending pandemic's circumstances. While the first wave of the pandemic hit our and other healthcare systems with ferocity and limited time to plan, subsequent downtime between future waves allowed us to create a planning tool utilizing the 4 S's, Space, Staff, Systems and Stuff to provide continuity in patient care during the sustained crisis. To best utilize our current Space, we can rapidly convert non-clinical areas, such as conference rooms, to aid clinical operations and reduce exposure. Three additional ICUs can be created in non-critical areas to triple ICU capacity in addition to expanding from one to two Intermediate Care Units. Special considerations for those areas that can accommodate critically ill patients include determining the order to open the units in and establishing triggers for such; determining how to open each additional ICU (opening the entire unit versus in pods of 4); staffing critical care nurses, intensivists, and respiratory therapists; and availability of equipment, beds, negative pressure rooms, and medical gases.

To provide proper and prompt care to all patients admitted during an influx of patients, we have established rapid on-boarding and credentialing processes to mitigate a critical staffing shortage (Staff). Staff and care teams are supplemented by temporarily hiring external traveling healthcare professionals and recruiting SH staff possessing the knowledge to care for those with COVID-19. In addition, staff can be quickly reassigned to other COVID-19 specific roles to support other units with increased patient demand. Novel programs include the Home Oxygen program, Family Liaison program, Proning Teams,[60] and specialized COVID-19 care teams. To best utilize our system capacity, multiple workflows can be altered or newly created within the various clinical areas of the hospital to best suit the sustained pandemic demands. In

addition to patient-related workflows, expansion plans were also created for critical care areas, forward triaging in the ED in the case that the military tents were used, as well as acute care units. Managing stuff is a centralized process to ensure all appropriate equipment and PPE needed to sustain and maintain staff safety and patient care.

The psychological and physical impact of caring for the surge of critically ill patients is cited in the literature as being extremely distressing, causing acute psychological stress among frontline staff.[42–44] A cross-sectional survey assessed our essential workers' current state of welfare as well as motivators and coping strategies. Staff reported feeling burned out, emotionally distraught, and fearful for their own and loved one's safety. Furthermore, peer support and teamwork, along with constant communications from leadership, were factors that helped motivate SH's frontline staff to come back to work each day.[45,46]

To improve staff well-being and reduce their pandemic associated anxieties, numerous support programs became newly available such as calming "Peace Rooms", teaching providers transcendental meditation and the 24/7 Resilience in Stressful Events (RISE)[47] crisis peer support hotline. Furthermore, our medical residents reported high burnout rates and negative mental health consequences before, during and after the first surge,[48] an issue among all trainees and frontline workers cited in the literature by many throughout the last two decades.[49–51] Support initiatives to improve well-being including wellness coaching, team building events, and lectures on wellness topics are additional services advised by the literature and provided at SH for this at risk group.[52–54]

Importantly, partnerships with local and regional systems and coalitions aided in maximizing capacity and capabilities to provide regional consistency of care, cited as a best practice and a commonly used strategy during disasters and the COVID-19 pandemic.[10,55–57] We also instituted strong communication strategies which have also been initiated by other institutions as a best practice to ensure staff feel supported and to ensure the surrounding community is apprised and informed.[37,58,59]

Our experience, as well as others,[13,22,24] demonstrated that emergency planning is essential and even the best plans inevitably cannot foresee or anticipate every eventuality, as each emergency and crisis is unique. Due to the surge caused by the Omicron variant, our resources were pushed yet again as SH's inpatient census reached a daily high census of 91 patients. We are confident that the creation of the Playbook and its continued use and refinement allowed us to maintain most if not all our routine services.

Conclusion

SH's system wide response strategies greatly differed from previous disaster responses, as limited information on COVID-19 was available to guide executive leadership decision-making when leading through a disaster. Ultimately, our altered yet effective approaches to the pandemic enabled our 305-bed community-based teaching hospital to weather the first months of the pandemic, establishing a new normal for future practice and pandemic surges. As the pandemic continues, leadership must review their pre-defined HICS procedures and guidelines, ensure a HICS chain of command, designated surge teams with defined responsibilities, and amplified surveillance for an organized, timely, and effective response.

Although crisis management for the COVID-19 pandemic at SH was initially through the HICS approach, utilization was restricted due to its limited intrinsic capacity to fulfill the disparate needs a community hospital may face during an extended health disaster. The undulating nature of COVID-19 therefore required HICS to be refined to ensure long-term stability and sustainability. Vital operations and systems must be pre-defined and maintained through the face of an event of such destructive nature to not only preserve life but to also provide essential functions to those patients not affected by COVID-19. In creating the COVID-19 Playbook, leadership can proactively address key operational strategies during the next emergency, ensuring our hospital is equipped to effectively mitigate threats and continue to optimize care of the patients and communities we serve.

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Disclosure

The authors report no conflicts of interest in this work.

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